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CONTRIBUTIONS TOWARD A MONOGRAPH OF THE
NOCTUIDÆ OF BOREAL NORTH AMERICA.

REVISION OF THE GENUS *HYDRÆCIA* Gn.

BY JOHN B. SMITH, SC. D.

Hydræcia was first used by Gueneé in 1857, in his Essay on the Classification of the Noctuidæ, and was applied in a more extended way in the Species General, in 1852. In the latter publication *micacea* was designated as the generic type, and in this sense Lederer defined it more accurately in 1857. Later European writers have in general followed this precedent, and after some shiftings between *Apamea* and *Gortyna*, Mr. Grote finally followed their example for our American species.

Gortyna was proposed by Ochsenheimer in 1816, but not very sharply limited, the type being the European *flavago*. Hübner at about the same time used *Ochria* for the same species, and Mr. Grote for a time used this term for some of our American forms, which he considered congeneric with the European species.

Gueneé used the term *Gortyna* for the type species of *Ochria* and for a number of others, among them several Americans—and he was followed by Walker.

Lederer pointed out the difference in clypeal structure between *Hydræcia* Gn. and *Gortyna* Ochs., and sharply defined the two genera.

Omitting the matter specifically, referring to the European species, Lederer's characterization is as follows:

Moderate, plump species, the primaries also sharp pointed, the

secondaries somewhat produced at the apex and a little retracted between veins 4 and 6. Front and palpi with short woolly vesture, the latter hiding the obtuse little terminal joint of the palpus. Thorax convex, with a sharp crest behind the collar and a truncated tuft posteriorly. Abdomen plump, in the male truncate at tip, in the female pointed; without tufts or with only a few divergent hairs on the first segment. Tongue spiral. Eyes naked. Antennæ thick, in the male with brush-like ciliæ and either smooth or with pyramidal teeth. Legs short and thick. Front without projections or similar modifications.

Strictly construed this definition excludes more than half of our species, which are yet not referable to *Gortyna* because of the unarmed front.

The truth is, Mr. Grote realized that there were two divisions without quite hitting the essential difference between them.

What may be called the first section contains species which agree with the characters above given by Lederer and of which *atlantica* and *immanis* of our fauna may be considered representatives.

The second section, for which the term *Papaipema* is proposed, consists of those species with broader primaries, the apex acute, the outer margin a little excavated below it and then bulging out at the middle. The male antennæ are simple and the anterior thoracic tuft is broad, transversely flattened, very prominent and usually a little notched centrally. It resembles in appearance an adze set up just behind the collar. Accompanying these points of difference is a very decided peculiarity of the male genitalia, for, while in *Hydræcia* proper there is nothing especially characteristic, nearly all the species of *Papaipema* have the harpes more or less forked and with a triangular patch of spinulated surface at the tip. The clasper is in almost all cases a long, stout, curved hook; but is unique in having the outer curve strongly toothed. This character is so unusual and so constant that it becomes important, especially in combination with the superficial peculiarities already mentioned.

The section *Hydræcia*, as represented in our fauna, is not particularly compact, and is easily divisible into sections containing from one to three species.

Albilunata and *v-album* differ from all the other species by the obtuse and rather short, broad primaries, which, as the species are compactly built, give them a heavier appearance than usual. The anterior thoracic tuft is somewhat loose and rather divided than

crested. *Albilunata* is a pale, reddish luteous species from the West, in which the reniform is a slender white lunule. The median lines are even, slender and whitish.

V-album is an eastern and southern species, of a rich, deep wine red or brown, the median lines slender, irregular and brown, and the reniform outlined inferiorly in white, so as to form a **V** or **U**, from which the name is derived. These two species have nothing in common except the general wing-form and build, and in the structure of the male genitalia they differ entirely.

In *albilunata* there is an oblique, broad harpe fringed at the tip by a row of spinules. There are two claspers; one of them toward the base very strongly curved, so as to form almost a semicircle; the other much longer, stouter, only a little curved and reaching almost to the end of the harpe. There is nothing inconsistent with the general tend of genital structure in this. In *u-album* the harpes are very broad at the base, forming almost a square plate, which abruptly narrows to half its width and terminates in a drawnout inferior angle. The clasper is a very broad, short process, narrowing rapidly to an acute tip, situated at the point where the harpe is suddenly narrowed. None other of the species in this series has a similar structure.

Velata forms a section by itself, with its narrow, pointed primaries, which have the outer margin distinctly scalloped. In color it is a deep, smoky brown, somewhat mottled, and the ordinary spots are narrowly outlined by pale scales—a unique character in the genus, by which this species may be at all times recognized. The male genitalia are hadniform in type, the harpes rather abruptly bent, the tip somewhat broadened and fringed with spinules. There is a slender, straight, pointed process at about the middle; but the main clasper is a large, stout, blunt corneous hook, which is only a little curved and twisted and reaches beyond the tip of the harpes.

Three species, which have in the past been considered as identical with the European *nictitans*, agree in trigonate pointed primaries, which are in general a shade of brick-red and in which the outer margin is even. In general maculation all are alike, having all the usual lines and spots, and none of them strongly contrasting. The lines are a deeper shade of red brown and the t. p. is geminate; the inner portion crenulate or lunate, the outer even. The ordinary spots may be yellow, white or concolorous within the limits of the same species; but there are no other white shadings.

In the common eastern species there is no one prominent feature, and the secondaries are reddish or smoky. This, from its general locality, I have called *atlantica*; but as a matter of fact it extends to the Rocky Mountains in Colorado. This is the species which most resembles the European *nictitans*, but the sexual pieces of the male differ completely.

Pacifica is so called from the fact that all of the examples seen by me comes from the Western Coast States, ranging from California to Vancouver. It seems to be less common than its eastern ally and is a little more brightly shaded. None of the examples seen by me have the ordinary spots white; but all of them have the angulated median shade well marked or even prominent. The secondaries are yellowish or purplish red and somewhat silky, quite different from the eastern examples. Finally, the primaries are somewhat shorter and broader, giving the species a stouter, chunkier appearance.

Interoceanica occurs, so far, only in the region about Winnipeg, Manitoba, but will probably be found north and west of that point. It may also extend southward into the United States; but I have no material from the border States. In wing form this is more like *nictitans*, but in color it is much darker, the secondaries being almost blackish. In the specimens before me the reniform is white; but this may not be a uniform character.

These three species I would hardly have dared to separate from *nictitans* had it not been for the differences in structure in the male genitalia; but these are so radical that specific identity is out of the question.

In the European *nictitans* the harpes are bent at the middle, forming a long trigonate tip, which is partly fringed and partly set with spines. There are two clasper-like corneous processes, but so irregular that verbal description is difficult. Reference should be had to pl. 1, fig. 7.

Atlantica has the harpes almost even throughout and only a little curved at the middle; the tip is rounded and fringed with spines, except at the inferior angles, while some distance within the tip is a triangular patch of densely set spines, which is found in no other species. The clasper is a very long, curved and somewhat twisted hook, which arises from a chitinous ridge within the middle.

Pacifica has the harpes decidedly shorter and more abruptly bent, forming a triangular tip that is elevated above the usual portion. The upper half of the tip is fringed with spinules. The clasper

arises from the depressed basal portion, is abruptly bent and tapers to a long acute tip, extending somewhat beyond the lower angle of the tip of the harpes.

Interoceanica has moderately curved, rather narrow harpes, which are dilated to form a broad curved tip, in which the lower angle is acute and the upper is obtusely cut. The tip is fringed with spines for its full extent, and there is a triangular patch extending in from the lower angle which is also densely spinulated. The clasper is a very short, slightly curved, stout, cylindrical claw, with an obtusely truncated tip. It will be seen, therefore, that there is no lack of structural characters to separate all these species, however much they may be superficially alike.

Juvenilis is a smaller species than those just described and with even narrower wings. In color it is a rather bright clay yellow, with all the usual markings evident. The median lines are single, the t. p. crenulated and not followed by an even outer shade. The median shade line is angulated and very distinct. The size and color easily mark the species, and the sexual structure is equally distinctive. The harpes are moderate in width, a broad, rather obtuse process being sent out inferiorly. The tip is not specially modified and has only a few longer, stiff hairs. There are two claspers: one of them arises near to the middle, is broad at base, semi-cylindrical and tapers to an acute point. It is only a little curved and extends more than half-way to the tip. The other is much shorter, but more curved, cylindrical, stout, rather obtusely tipped and arises close to the tip of the harpes.

Immanis, *stramentosa* and *obliqua* differ from all the preceding by the presence of a pale shade following the t. p. line. The latter is single or, if the outer portion is indicated, the pale shade forms the included space. Besides this pale shade there is no prominent maculation, though all the lines and spots are outlined; but there is a tendency to darken the median space. The European *micacea* belongs in this series, and our American representative is *immanis*, which is larger though otherwise closely resembling its foreign ally.

Immanis is the largest species in this series and it shows the least contrasts. In color it is a dull earthy brown, hardly darker in the median space, and with the t. p. line about parallel with the outer margin. The harpes of the male are very broad at base, abruptly bent above and narrowed from below toward a somewhat lappet-like tip, which has a rather sparse fringe of spinules. There is a

long, curved, semicylindrical clasper with regular edges, starting near the middle of the upper margin and curved so as to reach the inferior angle of the tip of the harpe. Two small, supplementary claspers arise nearer the inferior margin, beyond the origin of the larger structure.

Stramentosa is almost as large, with essentially the same markings, but entirely different coloring. The ground is a pale clay yellow, the costal region shaded with reddish to the t. p. line, while the other shadings, especially the outer third of the median space, are distinctly olivaceous. The insect reminds me strongly of a *Cosmia*. In a general way the male characters resemble those of *immanis*, but the bent part of the harpe is much narrower, the tip much smaller, with rounded angles, while the single clasper is much stouter basally and has even edges.

Obliqua is distinctly smaller, the median space is always darker than the rest of the wing, and sets off the very oblique t. p. line and its accompanying whitish shade. The outer margin of the primaries is also more oblique than in the preceding, though not so much as the t. p. line. The harpes in the male are much as in *immanis*, but the tip is decidedly broader. There are two small, corneous claspers, of which that nearest to base is beak-like, and that nearer to the tip is cylindrical, pointed and twisted.

Medialis intensifies the contrasts of the preceding species; but the male antennæ are distinctly bristle tufted, the joints serrated. The ordinary markings are much less defined; but essentially as in *obliqua*. The harpes in the male narrow abruptly from below to form a triangular tip, which ends almost squarely, and is fringed with spinules, except at the lower angle. There is a beak-like clasper with a broad base at the narrowest part; its point extending to the end of the inferior angle of the tip of the harpe. Another small, obtuse, cylindrical process arises nearer to the middle.

Pallescentis is yet more contrasting, but with a wash of white over the whole primary, which gives a peculiar dead shade to the coloring. The male antennæ are decidedly more strongly serrated, and the bristle tufting is more obvious than in the preceding species. The genitalia are much like those of *medialis*, but the clasper arises near the middle of the harpes and extends to the lower angle of the tip. It is very broad at base, semicylindrical and with regular edges. A small, cylindrical, somewhat club-shaped process arises within the cavity at the base of the main clasper.

Senilis resembles the last preceding two species in the serrated and bristle-tufted antennæ; but in little else. The ground color is a peculiar, dull, rusty brown, on which the slightly darker lines trace out the usual maculation. In all essentials we have the maculation of *nictatans* (*atlantica*) with the color of *Pachnobia littoralis*, for which this species might be at first mistaken. The harpes of the only male before me are broken at the tip, but the main clasper is large, semicylindrical, very broad at base and tapering to an acute tip; the margins irregular. At the base of this is a small, pointed, beak-like process.

Serrata differs from all its allies in the well-pectinated antennæ of the male. It is bright yellowish red-brown in color, with all the ordinary spots white and contrasting. It thus resembles, superficially, the species of the next series; but the wing form is not as described for that, nor does it have the characteristic thoracic tuft. Its antennal structure, combined with the ornamentation, will always identify the species. The male characters resemble in general those of *juvenilis*. The harpes are almost parallel, the tips obtuse and not specially modified. There is a long, stout and slightly curved clasper arising within the middle of the harpe and extending more than half way to its tip, to a point where a second broad, short, obtuse process arises near the lower margin.

The species of *Papaipema* are more closely allied, tho' several of them separate off easily.

It is in this series, and particularly in the species allied to *rutila*, that confusion has occurred in collections. Just what the distinctive characters are no one seemed to know: several names in the lists were not represented by specimens in any collection, and the range of variation was in doubt. It was assumed to be great, because of what was known of *nitela* and *nebris*, and of the forms of *nictitans*. Thus it came that two species were associated under *rutila* and two under *marginedens*. The latter species was often named *limpida*, and this was due to the fact that it was so named in the Graef collection, from which I obtained my first names in the Noctuidæ. The name remained on my examples, from which determinations were made for others, until I saw the type in the British Museum and called attention to the matter in the catalogue. It appears now that our species are much more constant than has been supposed and that there is really very little variation.

Cerina is readily distinguished by its lemon yellow ground color

and brown mottlings, which are scattered basally, but fill almost all beyond the t. p. line. The sexual pieces of the male are not quite like the type of the series; the harpes bend abruptly to form a narrow tip, which is set with hair rather than spinules; but the clasper is as described and set with teeth like a file.

Inquærita and *speciosissima* have the t. p. line geminate and even, both parts being almost equally distinct. The median shade line is rather prominent and distinctly angulated near the middle of the wing. The veins are all dusky and this, with the fact that the angle of the t. p. line is obtuse and formed near the middle of the wing, give the species a characteristic appearance.

Inquærita is rather a small species in which the ordinary spots are rarely white. The reniform is rather feebly marked, the orbicular is round or ovate, and the claviform is of the usual decumbent ovate form.

Speciosissima is much larger—one of the largest in the genus—and in all the specimens I have seen the ordinary spots are white, upright and linear. Even the claviform is of this unusual shape; hence the species should be an easily recognizable one.

Rigida is pale, straw yellow to the t. p. line, beyond which it is purplish brown, except at the apex, which is also yellow. In form of the t. p. line it agrees with *harrisii*.

In six species besides *rigida* the t. p. line on the primaries runs outwardly from its inception on the costa through the costal cell; then bends sharply on the subcostal and runs evenly and obliquely to the hind margin.

Harrisii, *verona* and *purpurifascia* are red or red-brown species. *Nitela*, *nelita* and *necopina* are mouse gray.

Harrisii has both parts of the t. p. line present, the inner being even and parallel with the outer, which is not fasciate. The space beyond the t. p. line is strongly shaded with purplish, except at the apex, and this shade sometimes extends over the entire wing. The ordinary spots are usually white.

Verona is a smaller and more brightly colored species with the markings as before, except that only the s. t. space is at all shaded with purplish. The ordinary spots are as before.

Purpurifascia has the inner portion of the t. p. line obsolete or very faint, while the outer is broad, distinct and developed into a real purplish band or fascia. This purplish shade usually extends through the s. t. space and may include the terminal space as well,

leaving only the apex free. The orbicular and claviform are usually white. The reniform is marked by white margining spots which are sometimes absent.

Nitela is the first of the mouse-gray species and is a somewhat variable form. The t. p. line is always distinct, accompanied by a whitish line, beyond which a pale cloud extends a variable distance; but the line itself is not so abruptly bent as in the brown species. In all cases the line is evenly oblique or almost rigid, and in many instances it seems to run directly into the costa; but not infrequently it bends or curves inwardly opposite the upper part of the cell and runs evenly into the costa. The ordinary spots may be present and white marked, or they may be scarcely traceable. The s. t. line is always traceable and sometimes distinctly marked by white scales.

Nelita is closely allied but is smaller, and the t. p. line, which is much less evident, runs outwardly to the inner margin just within the anal angle.

Necopina is larger than the two just mentioned and almost without markings. The t. p. line is barely traceable by a scattering of pale scales, and sometimes traces of the ordinary spots can be seen; but the s. t. line is not visible in any example seen by me.

In the remainder of the species the t. p. line may or may not be geminate, but is usually lunulate, crenulate or otherwise irregular: it is curved and bent over the cell and is somewhat drawn in below, never even, as in the preceding series.

Limpida and *cerussata* are very dark, blackish brown species, with white ordinary spots, and join naturally to the dark, mouse-gray species of the preceding series.

Limpida is moderate in size or rather small, and has the reniform quite broad and normally developed. In the male the mark is entirely white, though broken into blotches.

Cerussata is much larger, the reniform longer and narrower, the white spots grouped around a central, narrow, yellow line or crescent. The difference at first sight is not great, and I would not have been inclined to allow so much weight; but at this point the uniformity in male sexual parts is broken in a remarkable way. The harpes here are broad—very small for so large an insect—the tip is obtuse, the upper angle rounded and set with a few short, very stout spines, the lower a very little produced. The clasper is short, very stout, cylindrical, a little curved and with an obtuse tip.

All the other species are yellowish, reddish or brown, and in five of them the ordinary spots are never white marked, so far as the material seen indicates.

Frigida comes from Winnipeg and is a dull, powdery, red-brown form, in which all the markings are more or less obscured. The t. p. line is geminate and more even than usual here, a purplish wash is traceable outwardly, the median shade line is quite distinct, and the reniform is indefinite and blackish.

It somewhat resembles an *Orthosia* in appearance and is totally unlike any other of our allied forms. It is unexpectedly quite close to *cerussata* in the sexual parts of the male, differing chiefly in the longer and more slender clasper.

Unimoda is another species which has no marked characteristics. It is a large species, of the same dull, reddish luteous found in *senilis*, and all the markings are written in a somewhat darker shade of the ground color. The t. p. line is lunulate and the s. t. is unusually well defined. The sexual structure of the male is also like that of *cerussata*, save that the clasper is longer, broader at base and more evenly tapering to the tip.

From this point the usual form of sexual structure is again found and there is no marked departure until the last species is reached. Even there the departure is not radical, because the harpes remain as usual. It is odd and to me inexplicable that there should be this break in the continuity of structure, separating as it does two such similar species as *limpida* and *cerussata* and associating such totally different forms as *cerussata*, *frigida* and *unimoda*.

Angelica is quite brightly reddish brown, without contrasting ornamentation, save that the outer part of the t. p. line is fasciate, purplish and more even in course than usual. The reniform is obscured by a smoky shade in the cell.

Cataphracta is yellow in ground color and powdered with purplish. The basal space is marked with irregular spots, and beyond the t. p. line purplish predominates, except at the apex. The ordinary spots are always outlined, but never white in the large number of examples seen.

Impecuniosa is a small, rusty, red brown, powdery species, in which the apices of the primaries are unusually acute. The median shade is well marked and the s. t. space is well shaded with deeper brown.

In the remaining species the ordinary spots are always white

marked, and the only remaining subdivision is based on the shape of the reniform. In *circumlucens* and *rutila* the mark is normal in form, a little constricted centrally but symmetrical, and of about the same size above and below the constriction. In *appassionata*, *marginidens* and *furcata* the mark is much larger, hardly, if at all, constricted centrally, and the lower half much broader than the upper.

Circumlucens is even, yellow to red-brown in color, without strong contrasts anywhere, and the s. t. space hardly, or not at all, darker than the remainder of the wing.

Rutila is darker and redder, so strongly powdered in many cases as to seem rusty. The t. p. line at least is always well marked, and the s. t. space is always strongly shaded with purplish brown.

Appassionata is easily confused with *rutila* until the reniform is examined; but the size of this and its enlargement inferiorly is characteristic.

Marginidens is paler, more brick-red in color, with the purplish shadings not contrasting. All the markings are well defined, but there is nothing that stands out except the white spots. The darker shadings seem rather to give the wings a soiled appearance.

Furcata is very pale, almost straw yellow in color, with all the marking well written, but without dark shades or contrasts. The white spots are very large, the reniform broader than any other species, but the central portion is concolorous, the surrounding group of spots relieving this very prettily. In this species the clasper departs from the usual type and is forked at the tip. The upper process is irregular and forms a continuation of the basal portion; the lower process is much longer, slender, cylindrical and curved to form almost a semicircle.

The only species not known to me autoptically is *erepta* Grote, described from Kansas. I have no material from that State and have no sufficient recollection of the type to enable me to place it. The species is well enough described, however, to be recognized, provided it is an *Hydræcia* at all.

Our knowledge of the early stages of the species of this genus leaves much to be desired. Few of them, comparatively, are known at all, and others are only imperfectly described. In a general way they may be said to be borers, either in roots or stems and they have the usual appearance of species with such habits.

Mr. Henry Bird, of Rye, N. Y., has in recent years made a study

of the larval habits of several of our species, and his interesting paper is found in the Canadian Entomologist, xxx, 126, for May, 1898. The study of this branch of the subject may be safely left in his hands.

For the gift and loan of material in this genus I owe thanks to Dr. L. O. Howard, Curator of the Department of Insects in the U. S. National Museum, Prof. J. H. Comstock, Prof. S. A. Forbes, the late Dr. J. A. Lintner, Dr. R. Ottolengui, Dr. William Barnes, Dr. Roland Thaxter, Mrs. C. H. Fernald and the Messrs. Graef, Doll, Bird, Goodhue, Hanham, Moffat and others of my correspondents who responded liberally to my requests.

It is to be regretted that I could not include the species of *Gortyna* proper in this study; but I have found it simply impossible to get any material whatever of either species.

In tabular form the species may be arranged as follows:

Table of the species of Hydræcia.

1. Thorax with a loose tuft or small crest anteriorly; the latter sometimes a little divided, but never prominent nor transversely flattened; primaries as a rule moderate in width or narrow, trigonate; antennæ various.

hydræcia 2.

Thorax with a prominent, high anterior tuft, which is transversely flattened and a little divided centrally—somewhat resembling the blade of an adze; primaries broad, large, a little excavated below the apex; antennæ of male simple.....

papaipema 14.

2. Primaries short, broad, stumpy.....3.
- Primaries longer, trigonate, broadening regularly from base.....4.
3. Pale reddish luteous, with a slender, white lunule forming the reniform.

albilunata.

Deep, rich, purplish brown, the lower half of reniform outlined in white so as to form a small U.....

u-album.

4. Antennæ of male simple.....5.
- Antennæ of male with the segments marked and bristle-tufted.....10.
- Antennæ distinctly pectinated.....13.
5. Deep, somewhat smoky and mottled brown, ordinary spots narrowly outlined by white scales, fringes a little excavated on the primaries....

velata.

Lighter brown or reddish, ordinary spots never ringed with white scales, though the spots themselves may be white; fringes of primaries even..

6. T. p. line geminate, inner line crenulate or lunate, outer even, not followed by a pale shade.....7.
- T. p. line single, crenulate, the outer even line wanting, not followed by a pale shade.....8.
- T. p. line even, single, followed by a pale or whitish shade, or if geminate the included space is prominently pale.....9.
7. Dark red-brown; reniform white; secondaries almost blackish.

interoceánica.

- Rather dark brick red; reniform white, concolorous or yellowish; secondaries reddish or smoky.....**atlantica.**
 Pale brick red, reniform yellowish; secondaries yellowish or purplish red.
pacifica.
8. Reddish luteous, pale; all the lines obvious; median shade prominent, angulate.....**juvenilis.**
9. Large, dull brown, broad winged; median space scarcely darker; t. p. line parallel with outer margin.....**immanis.**
 Almost as large; but pale luteous, the costa shaded with bright reddish, the outer third of median space olivaceous.....**stramentosa.**
 Smaller, narrower winged, outer margin very oblique, as is also the t. p. line; pale red-brown, the median space darker..**obliqua.**
10. Median space deeper in shade; t. p. line very oblique, followed by a whitish shading.....11.
 Uniformly colored; no white shade following t. p. line...12.
11. Reddish to brownish luteous; the serrations of the antennæ less prominent.
medialis.
 Much paler, with a wash of white over a dull luteous ground; serrations of the antennæ strongly marked.....**pallesceus.**
12. Median lines narrow, hardly darker; t. p. irregular, geminate; ordinary spots paler, more yellow.....**senilis.**
13. Reddish luteous, the ordinary spots white.....**serrata.**
14. Lemon yellow, mottled with red-brown basally and beyond the t. p. line; the latter not well defined.....**cerina.**
 Colors straw yellow to red-brown and fawn gray.....15.
15. T. p. line geminate, even, with an even out curve, which forms the angle just above the middle of the wing; the median shade line narrow, defined and parallel with the t. p. line.....16.
 T. p. line sharply bent on the costa, forming the angle just below the subcostal; thence rather even and almost rigid to the inner margin....17.
 T. p. line geminate, quite evenly outcurved over the cell, not abruptly bent on the costa, the inner part of line more or less lunulated; median shade various.....20.
16. Size smaller, reniform obscure, rarely white marked; orbicular round or oval; claviform ovate, rarely white marked.....**inquesita.**
 Size large; reniform linear, white; orbicular and claviform also linear, upright and white in all specimens seen.....**speciosissima.**
17. Bright straw yellow, the usual markings outlined in brown; space beyond t. p. line, save apex, brown.....**rigida.**
 Yellowish to red-brown, powdery.....18.
 Mouse gray, powdered with whitish atoms.....19.
18. Inner part of t. p. line distinct, outer line not fasciate, all beyond it except apex brown, mottled.....**harrisii.**
 As before, but the terminal space is concolorous, leaving only the s. t. space brown.....**verona.**
 Inner part of t. p. line obsolete or feebly developed, outer line forming a distinct band or fascia.....**purpurifascia.**
19. T. p. line well defined; s. t. line always traceable, usually distinct.
 T. p. line angulate over cell, then inwardly oblique to hind margin.
nitela.

T. p. line not angulate, and as a whole outwardly oblique to hind margin.

nelita.

T. p. line barely traceable; s. t. line entirely wanting.....**necopina.**

20. Deep, blackish brown, with contrasting, white, ordinary spots, reniform normally wide; size moderate.....**limpida.**

As before, but much larger and the reniform is very narrow and elongate.

cerussata.

Yellow to red-brown; ordinary spots concolorous or paler; never white...21.

Yellow to red-brown; ordinary spots wholly or partly white.....22.

21. Dull, powdery red-brown; t. p. line geminate, rather even, median shade well marked; ordinary spots undefined, dusky..... **frigida.**

Even, reddish luteous, all the lines defined but not contrasting; t. p. line lunulate; s. t. line well defined, preceded by a dusky s. t. shade.

unimoda.

More reddish; ordinary spots obscured by a smoky shade, outer portion of t. p. line forming a purplish fascia.....**angelica.**

Yellow, powdered with purplish; basal space mostly purplish, and all beyond the t. p. line except apex, well shaded with the same color.

cataphracta.

Rusty red-brown, very powdery; s. t. space purplish; median shade broad, well marked, blackish; apex of primaries unusually acute.

impecuniosa.

22. Reniform moderate in size or rather small, the lower part not perceptibly larger than the upper; basal space not white marked.....23.

Reniform large or very large; the lower part distinctly larger than the upper; basal space usually white marked.....24.

23. Yellowish to red-brown, even, not powdery; t. p. line not contrasting; s. t. space hardly darker or purplish.....**circumlucens.**

Red-brown, strongly powdered so as to give a rusty appearance; t. p. line prominent, purplish, as are also most of the s. t. and terminal spaces.

rutila.

24. Bright, deep, red-brown, strongly shaded with purplish, especially in s. t. space; basal space white marked.....**appassionata.**

Paler, more brick red, with the purplish shadings scarcely contrasting; base of wing white marked.....**marginidens.**

Very pale, almost straw yellow; no white marks inside of basal line; no purplish shadings; all the markings brown and well defined..**furcata.**

Hydræcia albilunata nom. nov., pl. 1, fig. 1, ♂ genitalia.

lunata Smith.

1891.—Smith, Trans. Am. Ent. Soc., xviii, 110, *Apamea*.

1891.—Smith, List Lepidoptera, 45, *Hydræcia*

Ground color a reddish clay yellow with vague smoky shadings. Head and thorax without obvious markings. Primaries with the median lines rather feeble, evident, single, whitish. T. a. line rather well removed from the base, not at all prominent, rather evenly outcurved. The t. p. line better marked, but not in any way contrasting, evenly outcurved over the cell and rather evenly oblique below that point to the inner margin. The s. t. line is very faintly indicated. It is marked near the costa by a slight difference in shade between the apex and the space immediately within it, is traceable irregularly almost to the middle of

the wing, but lost below that point in the specimens before me. There is a slender black terminal line at the base of the fringes. The orbicular is entirely lost, or is represented only by a blackish dot. The reniform is a narrow, white, oblique lunule, margined by black scales and forming the only contrasting feature in the maculation. The submedian vein is shaded with blackish throughout almost its entire course. Veins 3 and 4 are shaded with blackish to the t. p. line, and vein 6 is black shaded through the s. t. space. Nearly all the veins are blackish marked in the terminal space. Secondaries very pale reddish gray, somewhat glistening, a little more powdered outwardly. Beneath almost whitish, with a reddish shading, the veins marked with dusky. Expanse 1.15 in.; 29 mm.

Hab.—Mt. Shasta District: Alameda, California, in June.

The term originally proposed by me proves to be preoccupied for a congeneric species, and I therefore substitute a new name. Few examples of the species have been seen in collections, and there seems to be little or no variation. The structure of the male genitalia is very simple. There is a moderately broad harpe bent near the middle, the tip round and fringed by a series of small spinules. There is a long, stout clasper extending from within the middle almost to the tip at its inferior margin. From about the middle of the harpe there starts a strongly curved cylindrical process, with a blunt, rounded tip forming a second clasper. The moth is very simply marked, and the species should be easily recognized. It is questionable whether it should not form, with *u-album*, a distinct series.

Hydræcia u-album Gn., pl. 1, fig. 2, ♂ genitalia.

1852.—Gn., Spec. Gen., Noct., i, 345, *Ceramica*.

1856.—Wlk., Cat. Brit. Mus., Het., x, 418, *C. v-album*.

1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 22, *C. v-album*.

1891.—Smith, Proc. U. S. Nat. Mus., xiv, 231, *Mamestra*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 174, *Hydræcia purpuripennis* Grt.

1874.—Grote, Proc. Ac. Nat. Sci. Phil., 206, *Apamea*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 174, pr. syn.

baliola Morr.

1874.—Morr., Proc. Bost. Soc. N. H., xvii, 148, *Orthosia*.

1875.—Grote, Can. Ent., vii, 58—*purpuripennis*.

1875.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 309—*purpuripennis*.

Ground color a rich purplish brown, varying somewhat in shade, sometimes becoming almost carneous. Head and thorax usually a little darker, more intensely brown than the primaries, without special markings. Primaries with a deeper, richer, reddish brown shade through the middle of the median space, and throughout the terminal space. At the base and along the inner and costal margin there is a distinct bluish shading, which varies in intensity in the specimens, sometimes relieving the reddish brown disc quite strongly. The median

lines are brown, single. The t. p. line is very irregular, preceded by a bluish shade and as a whole outwardly oblique. The t. p. line is slender, crenulated, sometimes defined by a following paler shade, sometimes scarcely traceable. The s. t. line is marked by the difference in tint between the terminal and s. t. spaces, and also by a series of whitish scales. There is a pale line preceded by a blackish shading at the base of the fringes. Sometimes the paler scales are absent, leaving only the dusky shading, and sometimes there is hardly any difference between the terminal space and the fringes. The basal half line is usually distinct on the costa. The orbicular is quite usually wanting: if present it is always small and may be a blackish dot, or a black annulus surrounding a whitish dot; or there may be a white annulus surrounding a brown central dot. The reniform is moderate in size, normal in shape, the lower half defined and partly filled by white scales, giving the appearance of a U, from which the name of the species is derived. Secondaries smoky brown with a purplish shade, the fringes paler, more rosy in tinge. Beneath paler, the primaries smoky, the secondaries more yellow. Both wings may have an outer dusky line, and on the other hand there may be no trace of this present. Expanse 1.10–1.30 in.; 27–32 mm.

Hab.—Massachusetts, May, June and August; New York in July; Illinois; Minnesota; Key West, Florida, Southern Florida.

The localities above given are those that happened to be represented in the collection before me. The insect probably extends throughout the entire Eastern United States and to the Mississippi Valley. It is readily recognizable by the form of the reniform, which contrasts strongly against the rich red-brown ground color in which it is set. It has the same general shape of wing that is found in *albilunata*, and like that species the antennæ of the male are distinctly ciliated. The male sexual pieces are entirely different: the harpes are very broad at base, abruptly narrowed toward the tip, and the clasper is a short, broad-pointed process, resembling somewhat a broad beak. There is little variation, except in the amount of contrast between the brown and bluish or purplish shading on the wing.

Hydræcia velata Wlk., pl. 1, fig. 3, ♂ genitalia.

1865.—Wlk., C. B. Mus. Het., xxxii, 671, *Apamea*.

1891.—Smith, Can. Ent., xxiii, 121, *Apamea*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 174, *Hydræcia*.

sera G. and R.

1868.—G. and R., Trans. Am. Ent. Soc., i, 345, pl. 7, f. 55, *Hydræcia*.

1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 18, *Hydræcia*.

1874.—Grote, Proc. Ac. Nat. Sci. Phil., 1874, 206, *Apamea*.

1882.—Grote, Can. Ent., xiv, 170, *Helotropha*.

1884.—Bean, Can. Ent., xvi, 67, larva on *Anemone*.

1891.—Smith, Can. Ent., xxiii, 121, pr. syn.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 174, pr. syn.

Ground color a dark smoky brown, varying to gray or red-brown. Head and thorax without markings and of the usual ground color, except that the tips of

the scales may be gray on the thoracic crest. Primaries with all the markings traceable, but none of them contrasting. The basal half line is brown, visible on the costa in most specimens and sometimes below the cell. T. a. line imperfect, single, brown, almost upright, outcurved between the veins. T. p. line geminate, the inner line almost even or a little crenulated, slightly outcurved over the cell and a very little incurved below. The outer line is dotted, the dots connected by a dusky shading. The dots are on the veins and are black, followed by white in most cases. The white dots may be absent or they may be prominent and followed as well as preceded by a black dot. The median shade is broad, diffuse, well marked and forms an angle just below the reniform, which is inferiorly darkened by an extension of this shade. S. t. line pale, irregular, marked by the darker terminal space and by a dusky preceding shade. Near the costa it is defined by the paler apex and dusky s. t. space. There is a pale terminal line which is emphasized by black dots on the veins. All the veins are more or less flecked with white and black scales, particularly in the s. t. space and beyond it. The ordinary spots are moderate in size, concolorous or slightly paler, outlined by white and black scales. The orbicular is oval, oblique, the reniform upright, constricted in the middle and considerably dilated inferiorly. It is also blackish shaded in its lower portion. The fringes are distinctly scalloped, and the angle near the middle of the wing is much better marked than usual. Secondaries a smoky luteous, the fringes a little paler, with a darker line at their base. Beneath pale yellowish, primaries tending to become smoky, the secondaries tending to yellow. Both wings are powdered toward the edges, and both have a more or less well-marked outer dusky line and may have a discal lunule. Expanse 1.25-1.50 in.; 31-37 mm.

Hab.—Canada to Virginia, west to the Mississippi River, Missouri, Iowa. Date of flight June, July and August.

This is not an uncommon species, and occurs throughout the whole Northern, Eastern and Central United States. The specimens run even, and the species is recognizable by the fact that it is the only one in which the ordinary spots are outlined by white scales. The ring is a very narrow one, but is quite evident. The antennæ of the male are entirely simple. The harpes of the ♂ are long, very broad at the base, abruptly bent toward the tip, and at the point of bending is a large curved, corneous clasper, which extends to the tip and almost across the harpes at the base. Near the middle of each harpe is a slender, pointed process, which may be considered an accessory clasper.

Hydroecia interoceanica n. sp., pl. 1, fig. 4, ♂ genitalia.

Ground color a very dark smoky brown, the ordinary markings almost blackish. In general the species resembles *nicitans*, or, more correctly, *atlantica*; but it is smaller, much darker in general color and, so far as the specimens in hand show, the reniform is uniformly white marked. The orbicular in all the specimens before me is round, considerably paler and more yellowish than the ground color, but without any trace of white markings. Expanse 1.10-1.25 in.; 28-31 mm.

Hab —Winnipeg, Manitoba.

Three specimens, representing both sexes, are at hand from Mr. A. W. Hanham. I have no details regarding to capture of the species and no date. The insects were assumed to be forms of *nictitans*, and look like small, dark examples of that species. There is really very little that can be added to what has been already said concerning the male structural characters. The ciliations in the antennæ are very small and easily overlooked, except on close examination.

Hydræcia atlantica n. sp., pl. 1, fig. 5, ♂ genitalia.

nictitans ‡ Auct., pl. 1. fig. 7, genitalia of European species.

1852.—Gn., Spec. Gen. Noct., i, 126, *Hydræcia*.

1856.—Wlk., Cat. Brit. Mus. Het., ix, 159, *Hydræcia*.

1874.—Grote, Proc. Ac. Nat. Sci. Phil., 206, *Apamea*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175, *Hydræcia*.

nictitans var. *americana* Speyer.

1875.—Speyer, Stett. Ent. Zeit., xxxvi, 152, *Hydræcia*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175 = *nictitans*.

Apamea lusca Harris mss.

1891.—Smith, List Lepidoptera, 45 = *nictitans*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175.

Ground color rusty red-brown, varying somewhat in shade, sometimes quite smoky, and occasionally a specimen will become decidedly more yellowish or even luteous in tint. The collar is a little paler inferiorly, a brownish line marking the point where the difference in shade begins. The edges of the patagiae are often blackish. The primaries have all the markings distinct, but hardly contrasting, the lines being just a little darker than the ground color. The ordinary spots are paler in color, and either more rusty or more yellowish if they are not white filled. Basal line geminate, distinct, easily traceable to the submedian vein. T. a. line geminate, the space between the lines unusually wide. As a whole the line is upright, but outcurved between the veins. T. p. line geminate, the inner line irregular and crenulate, the outer often with a very faint outcurve. The median shade line is rather neatly marked, only a little broader than the other lines, a little more distinct, sharply angulated at the middle and a little incurved below. The s. t. line is dusky, tolerably well marked, darker than the terminal space and broken only at the apex, which is a little paler than the rest of the wing. All the veins are dusky and the venation is thus readily traceable. The orbicular is round or nearly so, moderate in size, narrowly ringed, a trifle paler than the ground color, rarely white. Reniform kidney shaped, moderate in size, sometimes a little constricted on the inner edge, but more usually irregular in shape. It may be a little paler than the ground color, it may be white, or it may be white marked to a narrow brown lunule which is near the inner border. The claviform is traceable in most specimens and is sometimes often even distinct. Ordinarily it is small, extending half way to the median shade, outlined as are the other spots and sometimes paler in color; never white marked in any specimen that I have seen. Secondaries smoky in some cases, almost blackish in others, again with a strong tendency to yellow. Beneath more or less smoky, especially on the primaries; both wings with an outer line and with a small discal spot. Expanse 1.15–1.40 in.; 29–35 mm.

Hab.—Nova Scotia, Hudson's Bay Territory, southward to Virginia, west to Colorado. Dates in New York range from early in July to late in August. In Illinois from the middle of July to the beginning of September.

This is the species that is ordinarily named *nictitans* in collections and, compared with the European examples of this species, it is almost impossible to say where the difference comes in. Superficially the markings are almost alike, and are certainly well within what is considered the ordinary range of variation. The antennæ in the male are very much alike, but the European examples are much more strongly ciliated than the Americans. The difference in the sexual characters has already been alluded to and need not be detailed again here. Our species seems, as a whole, to be a trifle more heavily built; but otherwise, and judging from superficial characters alone, their separation would hardly be justified. The range of variation in the species is not great; the difference in ground color is not particularly startling, although by placing the extremes together it is seen to be quite marked. There is a tendency to a violet tint in the s. t. space. In some cases the ordinary spots are both contrastingly paler and more rusty than the rest of the wing. In others there is hardly any difference to speak of. Finally, we may have examples in which the reniform becomes entirely white, and occasionally a specimen in which the orbicular also is of that shade. This species is the most common of those found in this country and deserves more attention than has been given to it heretofore.

Hydroecia pacifica n. sp., pl. 1, fig. 6, ♂ genitalia.

This is the Californian representative of the European *nictitans*, and resembles the latter almost as closely as does its Atlantic relative. There is a difference here, however, which is quite noticeable when a good series of examples is under consideration. The Pacific Coast form is uniformly more chunky, the body is more heavily built, the thorax is squarer and the primaries are shorter and comparatively broader. Altogether it looks like a much more compactly built species. In average size it is smaller than the eastern form, but the wings are less pointed. So far as markings go there is not much difference, and certainly none that would be considered as of specific value. In all the examples before me, both sexes being represented, both the ordinary spots are rather contrastingly yellowish, and none of them show the least trace of white. The

antennæ of the male are almost entirely simple, the ciliations being even less marked than in the Atlantic Coast form. Examples of this species are in the collections of the U. S. National Museum, Rutgers College and E. L. Graef.

Hydroecia juvenilis Grote, pl. 1, fig. 8, ♂ genitalia.

1881.—Grote, Bull. Geol. Surv., vi, 267, *Gortyna*.

1881. Grote, Trans. Kans. Acad. Sci., vii, 68, *Gortyna*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 174, *Hydroecia*,

Ground color a rather pale yellow, with a more or less reddish tinge. Head and thorax without special maculation. All the wing markings well written and brown. Basal line geminate, distinct to the submedian vein. T. a. line geminate, as a whole almost upright, the inner part quite even to the submedian vein, there inwardly toothed and outwardly curved; the outer portion is more irregular, and to it is attached the little claviform, which extends a short distance into the median space. The t. p. line is single, unusually distant from the t. a. line and very close to the outer margin. It is crenulated, and as a whole almost parallel with the outer margin after the first outcurve over the cell. The median shade line is unusually distinct, crosses a little beyond the middle of the wing and forms almost a rectangle below the reniform. The s. t. line is brown, fairly well defined, except toward the apex, which is the palest part of the wing. The terminal space below the apex is darker than the balance of the wing in the majority of the specimens. In some cases the entire median space becomes suffused by a smoky shade. The ordinary spots are narrowly outlined and of the ground color or a little paler, never white in the specimens that I have seen. The orbicular is usually large, almost round or only a little oval. Reniform moderate or small, kidney shaped or oval. The claviform is small and has been already described. Secondaries smoky, with a purplish shade. The fringes with a distinctly paler line at base. Beneath yellowish, with a bright purplish outer line and sometimes an inner shade line on both wings. The secondaries have a small black discal spot. Expanse 1.10-1.20 in.; 28-30 mm.

Hab.—Colorado, foot hills near Denver; Glenwood Springs, September 16th.

Six examples, representing both sexes, are before me, and the only difference observable is the tendency to a smoky suffusion in the median space of some of the examples. The species is the smallest in average size of those belonging to this series and the wings are a little the most pointed. The apex is distinctly acute, while the outer margin is only slightly pointed and unusually oblique. The male antennæ are almost simple. The genitalia are unique, the harpes long and narrowing toward the tip, except that there is a broad, short process from the middle of the lower margin. The tip is obliquely cut off and set with a few stiff spines. There is rather a large pointed clasper arising within the middle, extending well towards the tip, and at the point to which it reaches another smaller, cylindrical and slightly curved clasper is inserted into the harpe. The species does not seem to be common.

Hydræcia immanis Gn., pl. 1, fig. 9, ♂ genitalia.1852.—Gn., Spec. Gen. Noct., i, 128, *Hydræcia*.1856.—Wlk., Cat. Brit. Mus. Het., ix, 162, *Hydræcia*.1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 18, *Gortyna*.

1882.—Dodge, Can. Ent., xiv, 93, larva on Hop.

1884.—Smith, Bull. 4th Div. Ent. U. S. Dept. Agl., 38, larva.

1885.—Lintner, 2d Rept. Ins. N. Y., 41, larva.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175, *Hydræcia*.

Ground color dull yellowish brown, with a tendency to smoky. Collar with a central pale line and a pale line at tip. In some specimens a pale line also extends obliquely across the patagiæ. The markings of the primaries are distinct, as a whole paler than the ground color; the defining lines a darker shade of brown or tan. Basal line geminate, extending to the submedian vein; the included space pale, the inner line fairly well marked, the outer rather diffuse. T. a. line geminate, the included space paler, the defining lines well marked, as a whole upright, very even, except for a slight inward bend in the cell. T. p. line geminate, included space pale, the inner defining line well marked, the outer rather defined by the differences in shade than in any other way. The line is abruptly bent on the costa over the reniform and then is almost evenly oblique inward to the inner margin. S. t. line blackish, distinct, a little irregular, broken only near the apex which is somewhat paler. The median shade is fairly well marked in most specimens, and is a little curved between the ordinary spots. Orbicular oval, almost upright, a little paler than the ground color, very often incompletely outlined. The reniform is large, upright, kidney shaped or a little constricted centrally, a trifle paler than the ground color, except that it is inferiorly sometimes a little darkened. There is a smoky brown line at the base of the fringes. The claviform is small, not visible in all the specimens; but sometimes dark filled so that it becomes quite a recognizable feature in the wing. Secondaries smoky, yellowish, darker in the female, with a dusky followed by a paler median line. There is a narrow dusky line at the base of the fringes. Beneath powdery, a little more reddish than on the upper surface; both wings with a more or less well-defined outer transverse line, the secondaries sometimes with a small discal spot. Expanse 1.50-2 in.; 37-50 mm.

Hab.—Northern United States to Iowa, South to Virginia; Colorado. New York and Illinois in August and September.

This is one of the largest species of this series, and at the same time most simple in markings. It resembles in general the European *micacea*, but is a larger species, and the antennæ of the male have the joints feebly marked and with very small brush-like tufts. There is no variation in the series before me, and nothing of any consequence in the species—so far as I have seen. The male genitalia have a rather long, narrow, bent tip which is fringed with spinules. There is a long, curved, semi-cylindrical clasper from the upper side near base, and there are two small, claw-like processes from the inferior margin a little beyond the middle. The larva of this species attacks the crown of hops, and it is of some economic importance.

Hydræcia stramentosa Gn., pl. 1, fig. 10, ♂ genitalia.1852.—Gn., Spec. Gen. Noct., i, 129, pl. 6, f. 2, *Hydræcia*.1856.—Wlk., Cat. Brit. Mus. Het., ix, 162, *Hydræcia*.1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 18, *Gortyna*.1893.—Smith, Bull. 44th U. S. Nat. Mus., 175, *Hydræcia*.

Ground color a rather dull luteous, with a dash of olivaceous. Collar with a narrow brown line above the middle, the tip distinctly smoky, as are also the tips of the thoracic tuftings. Edges of the patagiæ marked with smoky brown, which is particularly well marked at tip. Sometimes the entire thorax is darker, and in such cases the contrasts between the ground color and the markings just described are not great. The abdominal tuftings at the base are also dark. The primaries have a reddish shade over the costal region extending to the tip. The outer portion of the median space is distinctly darker, olivaceous, and stands out quite evidently from the rest of the wing. The basal line is geminate, fairly well marked on the costa, then broken and only marked as a spot below that point. T. a. line geminate, the inner line scarcely traceable below the cell: as a whole it is nearly upright, but is inwardly curved through the cell and has a very feeble outcurve below that point. T. p. line very even, rather abruptly bent on the costa, a little outcurved over the reniform, and then evenly oblique inwardly to the inner margin. S. t. line irregular, brownish or smoky, marked by a preceding shade in the costal region, and beyond that by dusky scales arranged quite regularly. There is an even line at the base of the fringes, which are dusky at tip and have a reddish shade toward the base. The median shade line is well marked on the costa and is blackish to the median vein; below that point it is olive-green and hardly darker than the shading of the outer part of the median space. In the costal region, between the outer part of the basal line and inner portion of the t. a. line, there is a blackish shading and a similar, though much less marked, shading extends from the inception of the t. a. to the median shade line. The ordinary spots are well marked; the claviform is slightly soiled, olivaceous in color. Orbicular almost upright, irregularly oval, of the ground color or a little paler, outlined in olivaceous. Reniform upright, oblong, the angles pointed, hardly constricted in the center. It is of the ground color, or may have a slightly reddish tinge. Secondaries pale yellowish, without obvious markings. Beneath yellowish, both wings with a smoky outer line, which, in the specimens before me, does not extend across the wing. Expanse 1.68-1.72 in.; 42-43 mm.

Hab.—Glenwood Springs, Colorado, September 10th, October 1st, foot hills near Denver. "Middle and Central States, New York, Illinois."

Three specimens have been under examination, and I have seen others. None of them, however, from the East. There is a question, perhaps, whether this species is correctly identified. The examples before me agree with Guenée's figure and description, and I cannot remember having seen any species from the East which might be fitted to them. While I saw the type in the British Museum some years ago, my recollection does not serve sufficiently well to enable me to say whether or not this is really his species. I

believe it to be so, and that probably, in his original description, the locality "New York" was an error. The other localities given in my catalogue followed Mr. Grote's notes. I have never seen any specimens of *stramentosa* identified by Mr. Grote. The examples before me are all very much alike, and they are evidently related to *immanis*. The male genitalia, while agreeing with the series to which I have related it, are distinctive. The harpes are broad at base, narrow slightly until just before the end, where there is an abrupt cut from the lower side, which leaves a slender process that expands into a somewhat ladle-shaped tip, fringed inwardly with spines. There is a very heavy, stout, corneous clasper arising from the harpe just within the point at which it narrows a little, curved and terminating acutely. The antennæ of the male have the joints marked, and at the sides set with little bunches of soft short hair.

Hydroecia obliqua Harvey, pl. 1, fig. 11, ♂ genitalia.

1876.—Harvey, Can. Ent., viii, 53, *Gortyna*.

1881.—Grote, Bull. Geol. Surv., vi, 268, *Gortyna*.

1884.—Smith, Bull. 4th Div. Ent. U. S. Dept. Agl., 38, *immanis*.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 175, *immanis*.

Ground color a somewhat sordid reddish brown, with a tendency to yellowish. Head and thorax without obvious markings, save that there may be a darker line across the collar above the middle. The primaries with all the marking traceable, but hardly contrasting: the t. p. line being the most prominent, and this best emphasized by the paler shade which follows it. The basal line is barely traceable across the costa. T. a. line not much better marked; but as a whole outcurved and outwardly curved between the veins. The t. p. line curves rather abruptly over the upper portion of the cell and is then rigidly oblique below. There is a slightly darker patch on the costa, which marks the inception of the s. t. line, and this is of such a shape that at first sight its edge seems to form the continuation of the t. p. line, making it appear as if that line extended obliquely from just within the apex to the hind margin. S. t. line pale, a little irregular, feebly marked by the slightly darker terminal space and sometimes also by a dusky preceding shade. There is a brown line at the base of the concolorous fringes. The median shade line is just traceable in most specimens. It is hardly to be distinguished on the costa, bends outwardly between the ordinary spots and is then angulated inwardly, running parallel to the t. p. line. A slightly darker shade extends through the median space below vein two. Ordinary spots barely outlined, of the ground color and moderate in size. Orbicular round or nearly so, varying somewhat. Reniform upright or nearly so, broad, rather irregular, kidney shaped. Secondaries pale yellowish, without obvious markings. Beneath pale yellowish, in some cases almost whitish, usually without markings, but sometimes with an incomplete outer line. Expanse 1-1.60 in.; 25-40 mm.

Hab.—Dakota, South Dakota, Colorado, Arkansas, Northern States west of the Mississippi to the Pacific Coast.

I had, from sufficient material, considered this species as a variety of the Eastern *immanis*, and I believe that there is some record of its having similar habits in the larval state. The species is a very good one, however, when abundant material is at hand. It runs uniformly smaller, is narrower winged than the eastern species, and there are other differences in the details of markings that will appear on a comparison of the descriptions. The male antennæ have the joints distinctly marked and obviously brush tufted, though the tuftings are short and of soft hair. The sexual organs are characteristic; the harpes rather narrow, stout, abruptly cut near the tip which is bent, somewhat dilated and has a fringing of rather long stiff spines. There are two clasper-like processes, the one nearest to the base small and rather blunt, the other inserted at the point where the harpe narrows, and this is more irregularly twisted. The differences in size are quite strongly marked; but in other respects there is little range of variation, judging from the examples before me.

Hydræcia medialis Smith, pl. 1, fig. 12, ♂ genitalia.

1894.—Smith, Trans. Am. Ent. Soc., xxi, 74, pl. 1, *Hydræcia*.

Ground color a dirty clay yellow, varying in shade to olivaceous in one direction and to distinct red-brown in the other. The median space of the primaries always darker and most richly tinted. Head and thorax without markings, the thoracic tuftings very feebly developed. Primaries with the markings rather obscure. The basal line is not obvious in any specimen before me. T. a. line pale, not contrasting, usually not margined inwardly, but sometimes with a slight darkening of brown scales; outwardly marked by the difference in shade between the basal and median spaces. It is usually a little curved in the cell and almost upright or only a little outwardly bent below that point. T. p. line pale, forming the most prominent feature of the wing marking; abruptly bent on the costa and then very evenly oblique to the inner margin. S. t. line pale, defined by the difference in shade between the darker terminal and pale s. t. space; but this difference is hardly appreciable. In some cases there is a brighter line at the base of the fringes. Ordinary spots visible, never entirely outlined and sometimes without distinct margins. Orbicular a little oval, oblique, somewhat paler than the median space, in which it is situated. Reniform kidney shaped, the upper portion fairly well outlined, as a whole a trifle paler than the surrounding space; but there is a dusky lunule through the centre which becomes darker inferiorly. There is a vague indication of a claviform in the shape of a slightly paler streak extending from the t. a. line half way across the median space. There is no visible median shade in any specimen before me. Secondaries varying from soiled whitish to very pale, almost straw yellow; a distinct dusky extra median line being present in all examples. Beneath a very pale shade of the ground color, a little powdery and with a rather broad smoky line on both wings. Expanse 1.60-2.05 in.: 40-52 mm.

Hab.—Washington; Colorado, foot hills; Glenwood Springs; collected by Bruce and Barnes.

This species is quite readily recognizable by the distinct contrast between the median space and the rest of the wing; the pale t. p. line being rather distinctly marked, quite narrow and well defined. The antennæ of the male are distinctly brush like, the joints are well marked, the lateral processes almost equal to the diameter of the joint in length and with tuftings of soft, bristly hair. The sexual pieces of the male are of the same general type as those previously described, but differ obviously in detail. The harpes narrow rather regularly toward the tip, which is cut off obliquely. There is a somewhat irregular, broad basal clasper, and toward the tip there is a beak-like process which terminates acutely. The species seems to be not uncommon where it occurs, and it varies in the ground color, which ranges from a dull, dirty, clay yellow to a bright, clean, reddish brown. The largest specimen seen is a male from Washington, in the Graef collection.

Hydræcia pallescens n. sp., pl. 1, fig. 13, ♂ genitalia.

In general appearance and character this species resembles *medialis*, of which I at first considered it a variety. The chief difference, superficially, is in a decidedly paler ground color and an appearance as though there was a white washing over the entire surface. The ordinary spots are much more vaguely defined—in fact they can hardly be said to be defined at all, and in some cases are merely shadings, a little paler than the ground color. The t. p. line is not so definite outwardly and is rather a shade, which merges gradually into the usually darker s. t. space. The antennæ of the male have the processes on the joints longer and the bristles more prominent than in the other species. The sexual organs are in general like those of the preceding species; but the clasper is very long, semicylindrical, very broad at the base, with the edges irregular towards the tip. Expanse 1.50–1.90 in.; 37–48 mm.

Hab.—Calgary, August 21st, September 1st. Fort Klamath, Oregon, August 21st.

Hydræcia senilis Smith, pl. 1, fig. 14, ♂ genitalia.

1894.—Smith, Trans. Am. Ent. Soc., xxi, 73, pl. 1, *Hydræcia*.

Ground color a dull, rusty, red-brown, the veins darker. Head and thorax without obvious markings. Primaries without contrast, all the lines present, only a little darker than the ground color, narrow. Basal line geminate, extending to a submedian vein, but feebly marked, except on the costa. T. a. line single, slender, as a whole upright, but outwardly bent, curved or angulated between the veins. T. p. line geminate, slender, almost even or only a little marked on the veins; the inner line the darker and more obvious of the two, the space between the lines unusually broad. S. t. line indicated by the slight difference in shade between the darker terminal and lighter s. t. space. The median line is indicated by a vague dusky shading through the center of the wing. Orbicular small, round or nearly so, concolorous or a little paler, not definitely outlined. Reniform broad, oblique, a little irregularly kidney shaped, more rusty yellow

than the balance of the wing. Claviform narrow, pointed, extending to about the middle of the median space, concolorous or only a little paler. Secondaries smoky, paler toward the base. Beneath pale, with a tendency to a reddish or yellowish shading, somewhat powdery, the disc of the primaries tending to smoky. No outer lines in any of the specimens before me. Expanse 1.50-1.60 in.; 37-40 mm.

Hab.—Colorado, Bruce.

The insects were probably collected in the mountains not far west of Denver. The species is a very obscure one and resembles somewhat a very much washed out *atlantica*. It has also somewhat the appearance of a *Pachnobia*, and would easily pass for a member of that genus. In the male the antennal joints are marked, but not prominently so, and they are laterally set with tufts of soft hair. The male genitalia are imperfect in the specimen under examination and the tip of the harpe was broken off. There is a double clasper, the outer being broad at the base and the edges irregular, terminating in a sharp point. The inner is a small curved hook arising from a rather broad base and narrows rapidly to a sharp point. Very few examples of this species have been seen.

Hydroecia serrata Grote, pl. 1, fig. 15. ♂ genitalia.

1880.—Grote, No. Am. Ent., i, 94, *Gortyna*

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 179, *Hydroecia*.

Color a rather bright reddish yellow, the ground being yellow, washed with red to a variable extent. As a rule the head and thorax are quite obviously yellow. The red washing becomes evident at the sides of the palpi, on the front of the head, then at the sides of the collar, at its tip, on the thoracic tuftings, and then on the patagiæ which are quite frequently tipped with purplish. The tuft at the base of the abdomen is also quite usually purplish. The primaries have the basal space predominating in yellow, and yellow is also the shade extending along the costa and at the apex of the wing; else the red is most obvious. The basal line is very distinct, geminate, red-brown. T. a. line geminate, irregular, more or less broken, almost upright to the submedian interspace and then out-curved to the margin. The t. p. line is geminate, not so well defined, the included space yellowish, the inner defining line a little crenulated, the outer imperfect, but more even so far as traceable. Beyond this line the veins are narrowly dark marked. S. t. line obsolete in most specimens; but in some traceable by a few darker scales, emphasizing a difference between the s. t. and terminal spaces. There is a pale line at the base of the fringes, which are a little darker than the rest of the wing. The yellow apex has been already mentioned. The ordinary spots are white and contrasting. Orbicular round or nearly so, varying in size and usually with a central dot of the ground color. Reniform large, unusually broad, with a central yellow lunule surrounded by seven, more or less well-separated, white spots. The breaking up of the white spots is caused by the dusky veins which pass through the white filling. Claviform very broad and short, white, divided by a narrow central line which ex-

tends through it. Secondaries very pale, whitish, yellowish or a little smoky, darkening a little outwardly: the fringes usually with a reddish shading, which verges to scarlet. Beneath yellowish, pale, washed with reddish, which, in some specimens, has a distinct scarlet tinge towards the margins. Most specimens have an obvious dusky line on the secondaries, and a similar line is also apparent in many cases on the primaries. Expanse 1.25-1.50 in.; 32-37 mm.

Hab.—Colorado: Glenwood Springs, August 20th, September 1st (Dr. Barnes); Denver, September 12th (Oslar).

This species differs from all others in the genus by the lengthily pectinated antennæ of the male. It resembles, superficially, the species of the next series, and with them it has been heretofore associated. Besides the unique character of the antennæ, the form of the genitalia excludes it, as well as the absence of the adze-like thoracic tuft. The harpes of the male are narrow and quite even to the slightly pointed tip. There is a short, blunt, corneous process nearest to the tip, almost at the point reached by a long curved process or clasper, which originates within the middle and toward the lower margin.

Hydræcia cerina Grote, pl. 1, fig. 16, ♂ genitalia.

1874.—Grote, Proc. Ac. Nat. Sci. Phil., 200, *Gortyna*.

1882.—Grote, Ill. Essay, 59, pl. 2, f. 25, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 176, *Hydræcia*.

Ground color a bright lemon yellow, mottled with brown. Head bright reddish brown in front, the vertex yellow, base of the collar red-brown. The patagiæ are edged with brown, and the tuftings tipped in the same way. Basal line geminate, broken, the space between the basal and t. a. line more or less completely brown filled. The t. a. line is broken, imperfect, principally defined by the edge of the brown shading. T. p. line fragmentary, consisting of an irregular series of brown lunules, better defined by the brown s. t. space. The median shade consists of a series of brown marks and dots, which are not connected. S. t. line pale, marked by the difference in shade between the terminal and s. t. spaces, preceded by smoky, saggitate spots, which, in some cases, extend almost through the s. t. space. The terminal space is crossed by yellow, brown and smoky shadings, leaving the apex yellow. The fringes purplish brown. Secondaries very pale yellowish, tending to become a little dusky toward the tip. The fringes washed with reddish. Beneath a very pale yellowish, powdery, with a tendency to a reddish washing along the costa: Primaries with a discal lunule and a dusky shading near the outer margin. Expanse 1.40-1.50 in.; 35-37 mm.

Hab.—Maine; Kansas; London, Ontario; New Hampshire; Massachusetts.

This species is by no means common, but is easily recognizable by the bright lemon yellow ground color, the basal and extra median spaces being mottled with red-brown, which shades toward scarlet. Very few specimens have been seen, and there appears to be no appreciable variation, even in size.

Hydræcia iniquæsitæ G. & R., pl. 1, fig. 17, ♂ genitalia.1868.—G. & R., Trans. Am. Ent. Soc., i, 344, *Gortyna*.1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 110, *Hydræcia*.1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 18, *Hydræcia*.1882.—Grote, New List, 29; *Gortyna quæsitæ* err. typ.1882.—Grote, Can. Ent., xiv, 170, *Apamea*.1893.—Smith, Bull. 44 U. S. Nat. Mus., 176, *Hydræcia*.

Ground color yellowish brick red, powdered with rusty red and deeper brown. Head and thorax with a tendency to a violet shading, particularly on the collar and on the edges of the patagiæ, but this is not uniform. Primaries with most of the markings fairly well defined. The basal line is geminate, brown, hardly defined and in some specimens scarcely traceable. T. a. line geminate, the defining lines very narrow, brown, with a slight and rather even outcurve to the submedian interspace, and then a broader outcurve reaching the inner margin at the same point reached by the median shade line. T. p. line geminate, brown, outer line very distinctly darker and with a more violet shading: broadly bent or curved outwardly; the point nearest to the margin being at about the middle of the wing. The line is somewhat irregular on the costa; but very even on the incurve. S. t. line irregular, defined by the somewhat darker, more purplish s. t. space. The apex is of the paler ground color. Median shade very distinct, narrow, unusually well defined, angulated at about the middle of the wing, so that when viewed a little from the side it forms a perfect right angle. There is a dark, narrow, terminal line. All the veins are black marked, and their course is easily traceable throughout the entire wing. The ordinary spots are small, usually not very well defined. The orbicular is round or a little oval, somewhat paler than the ground color, although it may be contrastingly white. The reniform is upright or nearly so, kidney shaped, very poorly defined in most cases, sometimes with white marks around the edges. The claviform is very small, usually a little paler, yellowish, divided in the middle by a narrow brown line, which runs through the submedian interspace. In some cases it is white marked. Secondaries smoky, yellowish, sometimes with a tendency to a reddish shade, with a fairly well-marked smoky median line and often an obvious discal lunule. All the veins are dusky. Beneath pale, dirty yellowish, often with a reddish or carmine washing. Both wings with a more or less complete outer line and a traceable discal lunule. The veins on both wings are also dark marked. Expanse 1.05–1.50 in.; 26–37 mm.

Hab..—Kittery Point, Maine, August 18th. Long Island, N. Y., September 19th. New Hampshire in September. Generally distributed throughout the Northern and Central States east of the Mississippi.

This species is by no means a common one, and so far as shown by the specimens at hand seems to be very little subject to variation. The examples differ in size to a considerable extent, but very little in any other way. Ordinarily the spots are not white marked, but exceptionally they may become so. The very even geminate median lines and the very distinct and perfectly rectangular bend of the prominent median shade serve as distinguishing characters. The

antennæ of the male have very feeble lateral ciliations. The male genitalia are of the type that has been already described for this section. The triangular tip is well marked and the inner face is well set with short, stiff spinules. The clasper is of moderate size and well curved, with the upper edge distinctly and strongly serrated.

Hydræcia speciosissima G. and R.

1868.—G. and R., Trans. Am. Ent. Soc., i, 342, pl. 7, f. 52, *Gortyna*.

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 111, *Hydroæcia*.

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 177, *Hydræcia*.

Ground color yellowish brick red, with darker powderings. Head and thorax more or less shaded by purplish brown. The lower portion of the collar and the edges of the patagiæ are particularly well shaded. Primaries with all the lines fairly well marked. The s. t. space is purplish brown, and is the only contrasting portion of the wing, so far as ground color is concerned. The basal line is geminate, rusty brown, and extends to the middle of the submedian interspace. T. a. line geminate, brown, the inner portion most distinct, as a whole forming a very even, slight outcurve to the submedian vein, and then bending outward abruptly to the hind margin at about the point which is reached by the median shade. T. p. line geminate, brown, the outer portion of the line broader and more purplish. The line is outwardly oblique to vein 5, then bent rather abruptly, and runs inwardly oblique to the hind margin. S. t. line defined by the differences between the s. t. and terminal spaces, and as thus defined showing sharp teeth outwardly on the veins. There is a narrow, brown terminal line. The median shade line is distinct, rather narrow, fairly well defined and angulated on the median vein just before the end of the cell. The ordinary spots are narrow and upright. Orbicular narrow, oval, upright and white. Reniform very slender, narrow, defined by brown scales and white. Claviform also upright, very short and broad. All the veins purplish brown, so that their course is traceable throughout the entire wing. Secondaries very pale yellowish or purplish, the veins darker. Beneath shaded with purplish; the secondaries with a distinct outer line, primaries with an indication of a similar line, which is not complete in any specimen before me. Expanse 1.74-2.10 in.: 44-53 mm.

Hab.—Massachusetts in September; Ridgewood, N. J., August 30th. Long Island, N. Y.; New Hampshire.

This is the largest of the species belonging to this series. In general appearance it very much resembles *inquæsitâ*, but in all cases the ordinary spots are narrow, upright and perfectly white. This, in addition to the strongly angulated median shades makes the insect an easily recognizable one. Of this species I have seen no males. I have had, perhaps, from all collections, a dozen females; but I have not been able to get hold of the opposite sex. Were it not for the fact that both sexes of *inquæsitâ* were represented in my collection I would have been inclined to consider these two as sexes of one species.

Hydroecia rigida Grote, pl. 1, fig. 18, ♂ genitalia.1877.—Grote, Can. Ent., ix, 87, *Gortyna*.1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.1882.—Grote, Papilio, ii, pl. 1, f. 3 and 3a, *Gortyna*.1882.—Grote, Ill. Essay, 58, pl. 2, f. 24, *Gortyna*.1893.—Smith, Bull. 44 U. S. Nat. Mus., 176, *Hydroecia*.

Ground color very pale straw yellow. Head purplish gray, except on the vertex, which is of the ground color. Base of the collar also tinged with purplish gray. The bases of the patagiæ and anterior tuft are also purplish. The same shade may be found in some specimens at the base of the abdomen. Primaries shaded with purplish between the basal and t. a. lines above the submedian vein, and also in the s. t. space below the apex. Basal line geminate, brown, extending to the middle of the wing. T. a. line apparently single, the inner portion merged into the dusky shade: broadest and most prominent from the costa to the median vein, to which point it is outwardly and evenly oblique. It forms a rectangle above from that point to the submedian vein and is then curved outwardly, the line appearing geminate at this point. The t. p. line is unusually close to the outer margin, but starts from the costa just within the apex and runs evenly oblique to the hind margin, leaving an unusually wide median space. S. t. line narrow, brown, lunulate, with distinct outer teeth on the veins; usually better defined by the difference between the purplish s. t. and paler terminal spaces. In some cases the terminal space is almost as dark as the s. t. space and in such cases the s. t. line is scarcely traceable. The apex is of the ground color. There is a narrow terminal line at the base of the fringes. Median line narrow, brown, with an even outcurve, which is bent just below the lower angle of the median cell. The ordinary spots are of good size, ringed with brown; orbicular round or nearly so, sometimes with a brown central dot: reniform upright, a little constrictly centrally. In some specimens there is an inner lunule. Secondaries very pale yellowish, almost white; a blackish line at the base of the fringes, sometimes an outer dusky line and occasionally with a lunule and marginal shading. Beneath very pale, the veins smoky, sometimes with a discal lunule, and more frequently with a smoky outer line. Expanse 1.25-1.45 in.; 31-36 mm.

Hab.—Kittery Point, Maine, September 14th; Torrington, Conn.; Onondaga Valley, N. Y., September 15th; Massachusetts; Illinois.

It is probable that this species is found throughout New England and a portion of the Middle States, west to the Mississippi River; but it is by no means common. It shows very little variation, and its very pale straw yellow color will serve to distinguish it. The genitalia are after the usual type in this series. The male antennæ are furnished with short ciliæ.

Hydroecia harrisii Grote, pl. 2, fig. 19, ♂ genitalia.1881.—Grote, Bull. Geol. Surv., vi, 268, 276, *Gortyna*.1893.—Smith, Bull. 44 U. S. Nat. Mus., 177, *Hydroecia*.

Ground color a rusty red-brown, underlaid by a yellowish shade, very powdery. Head shaded with purplish, collar purplish, except at the tip where it is yellowish; patagiæ more or less purplish, with a tendency to a yellowish powdering in the center, which sometimes embraces the entire thorax. Abdominal tuftings

also purplish, the abdomen itself varying from yellowish to purplish. The primaries very strongly powdered through the median space, with all the ordinary markings fairly well written. Basal line geminate, brown, extending to the middle: within this line the wing is yellowish, forming a yellowish spot at the base. The rest of the basal space is more or less purplish, or very strongly powdered with deeper red-brown. Sometimes this powdering invades the extreme base, and it may thus become uniformly purplish. T. a. line geminate, not very well defined. From the costa it is upright or a little inwardly oblique to the submedian vein, then it makes an abrupt outcurve to the hind margin near the middle of the wing. T. p. line well removed outwardly, geminate, the inner line the narrower of the two, the outer line darker. It bends abruptly outward on the costa, then forms what is practically an acute angle and runs very evenly oblique to the inner margin. S. t. line dentate on the veins, very irregular, brown, best marked by the difference between the purplish s. t. space and the more evenly brown terminal space. The apex yellowish. There is a blackish line at the base of the purplish fringes. The median shade is fairly well marked, not well defined, rather narrow, and in a general way it is upright or a little bent on the median vein. Ordinary spots fairly well defined, rather small; the orbicular round, usually white, sometimes with a central dot, sometimes reduced to a white point surrounded by a few darker scales, in one specimen almost black. Reniform upright, narrow, a little constricted centrally, with a very narrow central lunule, which is defined by brown edges, and outside of this there may be from one to seven whitish or white spots. Sometimes the entire reniform is white, though occasionally it becomes blackish. The claviform is short and broad, divided by a narrow central line; usually it is white, sometimes it is reduced to a mere dot, and in one specimen it is blackish. Secondaries more or less smoky, shading to yellowish in one direction and to almost blackish in another. Veins smoky in most cases; a smoky discal lunule and generally also a more or less obvious outer smoky line are present. Beneath more or less washed with purplish. Both wings with a fairly well-defined median line and usually with a discal lunule, which is always more or less distinct on the secondaries. Expanse 1.42-1.68 in.; 33-42 mm.

Hab.—Kittery Point, Maine, August 30th to September 19th; Massachusetts; New York.

Most of the specimens that I have seen of this species come from Dr. Thaxter, and I have, by his kindness, a series of nine specimens which show a greater range of variation than any other species of the genus. This variation consists not in the maculation, but entirely in the amount of the dark powdering which extends through the wing. In one case the wing is almost yellowish, with scattered brown powdering and a slightly darker s. t. space. The extreme in the other direction is a dark smoky brown shade, with just an indication of the yellowish base. The s. t. space is uniform, purplish, almost blue, while the ordinary spots are nearly black. Between these extremes all intergrades are represented, yet the species is dis-

tinged in all cases. Its nearest common relative is *purpurifascia*, and this almost always has the t. p. line single and forming a rather well-marked band, which gives rise to the name. It has also much brighter color, and is distinctly less powdery than the species under consideration. In other respects the type of marking is almost the same, and without attention to the characters just mentioned, particularly the t. p. line, it is rather easy to confuse the two. In the male the genitalia offer nothing that is peculiar or different from the other allied species. The antennæ are, as usual, ciliated; the ciliations extremely short and forming little brush-like tufts.

Hydroecia verona n. sp., pl. 2, fig. 20, ♂ genitalia.

Ground color a rather sordid, yellowish red-brown, powdered with smoky and brighter red-brown. Head, base of collar and the edges of the patagiæ shaded with purplish. Primaries shaded with purplish at the extreme base, between the basal line and t. a. lines. The space above the median vein is shaded with smoky, and the s. t. space is almost blackish. Basal line geminate, reaching to the middle of the wing. T. a. line rather indistinct, best marked by the difference in shade between the median and basal spaces, geminate, inwardly bent to the submedian interspace, then with an outward bend to the hind margin. T. p. line distinctly geminate, both lines even, the inner narrower and not so dark as the outer. S. t. line irregular, dentate on the veins, marked chiefly by the difference in color between the s. t. and terminal spaces. A smoky terminal line. The veins through the terminal space are brown. Median shade fairly well defined, brown, rather evenly curved, touching the inner portion of the reniform. The space between the ordinary spots is powdered with purplish or smoky. Ordinary spots white marked. Orbicular upright, broadly oval, moderate in size, white, with a small central purplish dot. The reniform upright, moderate in size, a little constricted centrally, consisting of a central yellow lunule, around which are grouped more or less evident white spots. The claviform is short and broad, white, divided by a broad line, which runs through the submedian interspace. Secondaries yellowish, with a smoky tint outwardly, the veins marked with smoky. Beneath very pale yellowish, the veins smoky, both wings with an extra median line and with a feebly-marked discal spot. Expanse 1.10 in.; 27 mm.

Hab.—Winnipeg, Manitoba.

A single male specimen was received from Mr. Hanham. It resembles *harrisii* most nearly, and differs chiefly in the fact that the s. t. space contrasts with the terminal, resembling *purpurifascia* in that particular. In fact the species is intermediate in most respects between *harrisii* and *purpurifascia*. The male genitalia are distinctive, while yet they agree with the ordinary type, and reference to the figure will best describe the structure. The scantiness of the material prevents any suggestions as to the range of variation or other characters of the species.

Hydrœcia purpurifascia G. and R., pl. 2, fig. 36, ♂ genitalia.1868.—G. and R., Trans. Am. Ent. Soc., i, 341, pl. 7, f. 51, *Gortyna*.1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 110, *Hydrœcia*.1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 19, *Ochria*.1874.—Grote, Can. Ent., vi, 216, *Gortyna*.1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.1893.—Smith, Bull. 44th U. S. Nat. Mus., 176, *Hydrœcia*.

1897.—Slingerland, Can. Ent., xxix, 161, pl. 6, larval hist.

leucostigma || Harr.1862.—Harris, Ins. Inj. Veg., 440, *Gortyna*.1863.—Grote, Proc. Ent. Soc. Phil., ii, 432 = *rutila*.1865.—Grote, Proc. Ac. Nat. Sci. Phil., iv, 325 = *cataphracta*.1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 111 = *rutila*.1881.—Grote, Bull. Geol. Surv., vi, 268? = *harrisii*.

1898.—Bird, Can. Ent., xxx, 129, pr. syn.

Ground color a rather bright yellowish brick red, powdered with deeper brown and shaded with purplish. Head purplish. Collar purplish, except at the tip. Thoracic tufts and the edges of the patagiæ purplish. Abdomen with a more or less evident purplish shading throughout. Primaries with all the markings fairly well defined. Basal line geminate, extending to the middle of the wing: within this the wing is of the ground color, otherwise the rest of the basal space is purple. T. a. line geminate, the outer portion of the line usually more or less obsolete, except below the submedian vein, where it is generally distinct. In course it is oblique from the costa to the median vein, then almost upright or inwardly oblique to the submedian vein and then outcurved. T. p. line usually single, abruptly bent outwardly on the costa, and then broad and evenly oblique to the hind margin, forming a rather distinct band, which is much darker than any other portion of the wing. In some specimens the inner portion of the line is traceable for a portion of the distance. S. t. line lunulate, outwardly dentate on the veins, further emphasized by the purplish s. t. space, which contrasts against the more reddish terminal space. There is a brown line at the base of the purplish fringes. The apex is of the brown ground color, the median shade line narrow, distinct in most specimens, red-brown in color, moderately bent on the median vein. The orbicular is white, round or nearly so, with a brown central dot. The reniform is upright or a little oblique, moderate in size, a little constricted centrally. There is a central lunule, and outside of this there may be one or more white spots, which may combine to form a white margin around the spot. The claviform is short and broad as usual, divided, the lower portion almost always white, the upper portion more or less white, rarely entirely so, and sometimes without any white scales. Secondaries very pale yellowish, with a purplish shading, the veins smoky, a purplish submarginal band, and the fringes also shaded with this color. Beneath powdery, very strongly shaded with purplish, particularly along the costa and towards the apex. Both wings with an extra median line, and the secondaries with a dusky lunule. In some cases the dusky color of the s. t. space is reproduced on the underside. Expanse 1.12-1.52 in.; 28-38 mm.

Hab.—Maine and Massachusetts in September and August; Holderness, N. H., September 21st; New York in August and September; Illinois; Colorado.

This species extends probably throughout all the Northern, Eastern and Middle States, and to the Rocky Mountains in Colorado. It is one of the most common forms in the genus, and its life history has been well written by Mr. Bird.

Mr. Bird has also cleared up the synonymy of Harris's species *leucostigma*, a name, which, unfortunately, has been preoccupied. The species varies little, except in the intensity of the coloring. Its nearest ally is *harrisii*, and the differences from that species have already been pointed out. The genitalia of the male agree in a general way with those of the group, save that the clasper is unusually small and slender. The spinulation of the tip of the harpes is also less dense than in the immediate allies.

Hydroecia nitela Gn., pl. 2, figs. 21 and 22, ♂ genitalia.

1852.—Gn., Spec. Gen. Noct., i, 124, *Gortyna*.

1856.—Wlk., Cat. Brit. Mus. Het., ix, 158, *Gortyna*.

1869.—Pack., Guide to Study Ins., 310, f. 241, *Gortyna*.

1869.—Riley, 1st Rept. Ins. Mo., 92, larva.

1870.—Riley, Amer. Ent., i, 22, f. 11, larva.

1873.—Grt., Bull. Buff. Soc. Nat. Sci., i, 111, *Hydroecia*.

1875.—Pack., 9th Ann. Rept. Geol. Surv., 719, pl. 65, f. 6, *Gortyna*.

1876.—Riley, 8th Rept. Ins. Mo., 37, larva.

1880.—Riley, Amer. Ent., iii, 201, f. 107, *Gortyna*.

1883.—Saund., Fruit Insects, 334, f. 347, 348, larva.

1883.—Osborn, Can. Ent., xv, 174, larval habits.

1884.—Lintner, 1st Rept. N. Y. State Ent., 110, f. 26, larva.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 178, *Hydroecia*.

1898.—Bird, Can. Ent., xxx, 127, habits and early stages.

var. *nebris* Gn.

1852.—Gn., Spec. Gen. Noct., i, 124, *Gortyna*.

1856.—Wlk., Cat. Brit. Mus. Het., ix, 157, *Gortyna*.

1878.—Graef, Bull. Bkln. Ent. Soc., 1, 7, pr. var.

1881.—Riley, Papilio, 1, 107, habits and var.

1881.—Riley, Index and Suppl. to Mo. Repts., 56, pr. syn.

Ground color fawn gray, with a more or less reddish tinge, varying somewhat in specimens, powdery. Head and thorax with a distinct violet powdering, caused by the pale termination of the scales on head and thorax. Basal line barely distinguishable, paler, terminating at the middle of the wing. T. a. line yellowish, outcurved between the veins, with a deep inward tooth on the submedian vein and a broader outcurve below that point. The space within this line is apt to be a little paler and with a violet powdering, but this varies. T. p. line yellowish or whitish, geminate, the outer portion of the line usually rather indistinct. The line is oblique from the costa to opposite the middle of the cell, then makes an obtuse angle and runs obliquely to the hind margin. A pale shade extends outwardly from the line through the s. t. space almost to the terminal line. S. t. line variable in distinctness, made up of yellowish or whitish scales when best marked, lunulate, the teeth being outward on the veins, irregu-

lar. It is preceded by a brown shading, and the terminal space is usually a little darker than the s. t. space. Ordinary spots varying much in distinctness; they may be almost obsolete, they may be indicated by smoky or blackish clouds, and they may be distinct and white marked. In the latter case the orbicular is small, rather irregular, often with a central dot. The reniform is rather narrow, upright, marked with yellowish in the center and this with white outer margins. The claviform is divided into two spots, of which the upper may be wanting or punctiform: the lower is irregular in shape and may be anything from round to square. Secondaries smoky to blackish, the veins darker, in some case with a smoky lunule. Beneath gray, powdery, the secondaries a little paler than the primaries; both wings with a more or less obvious outer line, which tends to become lost on the primaries. Both wings with a small discal spot, which also tends to become lost on the forewings. Expanse 1.40-1.60 in.; 35-45 mm.

Hab —Canada to Georgia, west to the Rocky Mountains, Eastern States in September; northern Illinois September 15th; Normal, Illinois, July, August 20th, September 23rd and 25th; Schenectady, N. Y., September 23rd. Westchester County, N. Y., in September; Kansay City, Mo., August 18th; Mississippi in August.

This insect has two very well marked forms that have received different names. The typical *nitela* is that form in which the ordinary spots are barely traceable and are never white marked. The most prominent feature of the wing is the pale t. p. line, from which a light shading extends through the s. t. space. In the form *nebris* the t. p. line is not so prominent a feature and the ordinary spots are all white marked. In other respects I have been unable to find any difference, and in a long series of examples, such as I have had under examination, it is easy to pick out a series showing all the intermediate forms. The male offers no points of special interest, but agrees in a general way with the structure of the group. As this insect has an economic interest it has been written about more than any other, except *immanis* and the supposed *nictitans*. Like the rest of its tribe the caterpillar is a borer and infests grasses of various descriptions, as well as a number of other plants. Figure 22 illustrates the genitalia of the form *nebris*, and this figure is better than 21, which is distorted on the slide. The two are introduced to show that apparent differences may present themselves from differences in the preparation.

Hydræcia nelita Strecker.

1898.—Strecker, Lep. Rhop. and Het., Suppl. No. 1, p. 8, *Hydræcia*.

Ground color a reddish gray or fawn brown. Collar tipped with white scales. On the primaries all the markings are obscured, neither the basal nor the t. a. lines traceable. The t. p. line seems single: in course it is bent outward and then is almost straight or outwardly oblique to the hind margin, a short distance

within the angle. Beyond this line the wing is shaded with purplish and is thus a little lighter than the basal portion. The s. t. line is pale, irregular, broken, preceded by a dusky shading. There is a dusky shade at the base of the fringes, which is broken by white dots at the end of the veins. The ordinary spots are marked by dusky clouds on the costa. There are three white dots in the s. t. space. Secondaries yellowish, smoky, veins and a lunule darker. Beneath yellowish, powdery, with a purplish tinge. Secondaries with an outer dark line. Both wings with a discal lunule. Expanse 1.20 in.; 30 mm.

Hab.—Northern Illinois; Cartwright, Manitoba (Heath).

Through the kindness of Mr. Strecker I owe a male of this species, which I was at first inclined to consider a form of *nitela*. The course of the t. p. line, however, is so different and so constant in the examples in Mr. Strecker's possession that I concluded him correct in separating the species under the new name. In a general way the markings are like those of *nitela*; but the t. p. line is much less evident, besides differing in course. The species is also smaller than *nitela*, though small specimens of the latter occur. More material is needed to define the species satisfactorily. In sexual characters it does not differ to any appreciable extent from *nitela*.

Hydraecia necopina Grote, pl. 2, fig. 23, ♂ genitalia.

1876.—Grote, Can. Ent., viii, 25, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 179, *Hydraecia*.

1898.—Bird, Can. Ent., xxx, 131, habits and early stages.

Ground color fawn gray or brown, powdered with fine whitish or bluish atoms. Head and the inferior portion of the collar a richer dark brown, without the powdering, otherwise there is no marking on either head or thorax. Primaries almost uniform in color, the median space slightly darker; the t. p. line traceable in most specimens, but never prominent in any: when best marked it is seen to be geminate, made up of two very narrow lines, between which is a powdering of whitish scales. In some cases even this is entirely wanting and the wing is apparently uniform in color. Secondaries smoky, the veins a little darker and a tendency to a discal lunule. Beneath mouse gray, powdered with white scales. The fringes darker and uniform, except that they are tipped with white. Expanse 1.60-2 in.; 40-50 mm.

Hab.—Middle States; Westchester County, New York, in September; London, Ontario, Canada

This insect is one of the most easily recognizable of all the species, because of its almost uniform coloration. At first glance it resembles *nitela*, and indeed looks like that species with all the markings taken out, except the merest traces of the t. p. line and the somewhat paler shading in the s. t. space. None of the examples that I have seen, and by the kindness of Mr. H. Bird I have a very pretty series before me, has any trace of an s. t. line. The

structural characters of the male do not differ from those of *nitela*, save that the tip of the harpes is not nearly so strongly notched, while the clasper itself is somewhat heavier. The insect is by no means common, and so far as I am aware no one has had as many specimens as Mr. Bird, who has written of its early stages.

Hydræcia limpida Gn., pl. 2, fig. 24, ♂ genitalia.

1852.—Gn., Spec. Gen. Noct., i, 124, *Gortyna*.

1856.—Wlk., Cat. Brit. Mus. Het., ix, 157, *Gortyna*.

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 110, *Hydræcia*.

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 178, *Hydræcia*.

Ground color a very deep umber-brown, the median space of the primaries shaded more red-brown: the s. t. and sometimes the basal and terminal spaces as well, with a purplish tinge. The collar is tipped with whitish. Primaries with the markings traceable in most cases; but the chief ornamentation consists of the contrasting white ordinary spots. Basal line marked by yellowish scales. T. a. line hardly defined in any examples seen by me; principally marked by the slight difference in shade between the basal and median spaces. This indicates that it is a little incurved to the submedian veins and then bent strongly outward to the hind margin. T. p. line geminate, almost blackish, with an outward bend to vein 4 and then somewhat incurved in its course to the inner margin. S. t. line irregular, marked by reddish or yellowish scales and by a series of blackish spots which may be irregular, lunulate or formed into an almost continuous line. There is a blackish line at the base of the fringes, which are usually a little darker than the terminal space, but may be a little lighter. The median shade is blackish, outwardly bent from the middle of the costa to the lower angle of the reniform, then inwardly bent almost to the middle of the inner margin. Ordinary spots white, the orbicular irregular, usually with a central brown dot; the reniform oblique, moderate in size, a little constricted centrally, and the lower portion usually wider than the upper. It is made up of a narrow yellow central lunule, around which are grouped seven irregular white spots. Sometimes the central lunule is also white. The claviform is double, that is, consists of two spots, which may be of about the same size, or they may be different. Either one of them may be the larger, and either of them may be reduced to a mere point. The apex has usually a yellowish or reddish tint. Secondaries smoky, blackish, the veins marked, a discal lunule present in some cases. Beneath gray, powdery, sometimes almost purplish, becoming broken outwardly. Both wings with an exterior line and a dark discal lunule. Expanse 1.28-1.60 in.; 32-40 mm.

Hab.—Eastern and Middle States; Webster, New Hampshire, September 26th; Jefferson, N. H., in August; Chicago, Ill., September 24th.

This is one of the dark species in which the ordinary spots are white and contrasting; prominent because of the contrast, which has a tendency to obscure the balance of the ornamentation which is exceedingly ill marked. Most of the specimens that I have seen

are females, and in fact only two males are before me at the present time. The range of variation really consists only in the intensity of the brown shading. It may verge to red and it may tend to blackish. In the lighter specimens the lines are somewhat better defined; in the darker specimens they are almost lost. In other respects the markings are very constant.

Hydræcia cerrusata Grote, pl. 2, fig. 25, ♂ genitalia.

1864.—Grote, Proc. Ent. Soc. Phil., ii, 431, pl. 9, f. 1, *Gortyna*.

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 110, *Hydræcia*.

1874.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 18 = *limpida*.

1875.—Grote, Bull. Buff. Soc. Nat. Sci., ii, 216, sp. dist.

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 178, *Hydræcia*,

Ground color a very deep purplish brown, the median space of primaries more red-brown, but yet very dark. Head and thorax without markings, save that the collar is white tipped. Primaries with white blotches at the extreme base, within the basal half line, which is geminate and marked with white scales. T. a. line geminate, outcurved between the veins, with a long inward tooth in the submedian interspace and a long outcurve below that point. The line is emphasized by slightly paler scales between the ordinary defining lines. T. p. line geminate, with a broad outcurve over the cell and a slight incurve below. It is feebly lunulate between the veins. S. t. line irregular, outwardly toothed on the veins, in some cases forming a vague **W**, marked on veins 3 and 4. Marked further by yellowish or reddish scales, which form a pale apex to the wing and preceded by blackish scales, which form a more or less broken series of dots or an imperfect shade. A blackish line at the base of the fringes. The median shade is blackish, bent below the cell, not very well defined and yet easily traceable in every instance. The reddest portion of the wing is the median space below the submedian vein. The ordinary spots are contrasting, white, the orbicular almost triangular, the angles a little pointed, the base resting on the median vein. The reniform is unusually long and narrow, obliquely set, the center yellow, around which are grouped white spots. As a whole the lower part of the spot is broader than the upper; but in all cases the spot as a whole is very narrow. The claviform has the usual double white mark, and in all the specimens before me the two spots are of almost equal size. Secondaries smoky, the veins yet darker, a discal lunule visible. Beneath purplish, gray powdered, with an outer line, which is most distinct on the secondaries, and a discal lunule, which is also more prominent on the hind wings. Expanse 1.68-2.20 in.; 42-55 mm.

Hab.—Middle and Eastern States, south to the District of Columbia: Washington, D. C., August 10th; Massachusetts in September; Iowa; Illinois.

This species is a close ally to *limpida*, and there is very little in the general appearance to distinguish the two. The color is practically the same, the markings are almost identical, except for the shape of the reniform, and this in *cerrusata* is unusually long and narrow. In *limpida* it has the more usual form, and there is noth-

ing about the form to attract attention. Mr. Grote has pointed out this character and it remains about the only one that I can find.

We are not left without positive proof of its distinctness, however, because, as already pointed out, there has been a remarkable break here in the character of the male genitalia, which can be best understood and appreciated by comparing figures 24 and 25 on plate 2. The explanation for this peculiar change in structure is yet to be discovered.

Hydræcia frigida n. sp., pl. 2, fig. 26, ♂ genitalia.

Ground color a dull reddish brown, more or less powdered with black. Head and thorax with a purplish gray shading. Primaries with all the markings obscure. T. a. line geminate, darker brown, very irregular, somewhat inwardly bent, but with a considerable outcurve below the submedian vein. The basal space is obscured, and, as the specimen is slightly defective, the basal line cannot be made out. T. p. line geminate, smoky, blackish, very even, a little outcurved over the cell and almost parallel with the outer margin below that point. The included space is a little more yellowish. S. t. line irregular, blackish, broken, somewhat lunulate below the middle, preceded by a blackish shading, which is outwardly relieved by a few yellowish scales. As a whole the s. t. space is a little more purplish than the rest of the wing; the terminal space also being somewhat darker than the middle. The apex is yellowish, the fringes are blackish. The median shade is broad, diffuse, blackish, just a little outcurved below the reniform. Orbicular brown, small, a little irregular, with a center of the ground color. Reniform moderate in size, a little oblique, with a brown outline and a brownish central band. Secondaries smoky gray or blackish, with a vague extra median line and discal lunule. Beneath yellowish, with purplish scales along the costal margins. Both wings with a vague, extra median line and small, black, discal spots. Expanse 1.25 in.; 31 mm.

Hab.—Winnipeg, Manitoba, Mr. A. W. Hanham.

The type is a male and the only specimen that I have seen. The genitalia are not unlike those of the typical form, but altogether more chunky, while the clasper is shorter and heavier in proportion. The male characters resemble those of *cerussata*; but the tip is set with much shorter and stouter pointed processes, which can hardly be called spines. The clasper is broad at the base, narrowing abruptly and forming a somewhat irregular hook, which has a jagged tip. Although very much smaller and quite different in appearance, it is evident that the species is allied to *limpida*, where the combination of superficial characters has placed it.

Hydræcia unimoda Smith, pl. 2, fig. 27, ♂ genitalia.

1894.—Trans. Am. Ent. Soc., xxi, 73, pl. 1, *Hydræcia*.

Ground color a rusty yellowish red, more or less powdery. Head and thorax with the edges of all the parts tipped with darker scales. Primaries with all the markings evident, but not contrasting. Basal line geminate, the space within it

being lightened by yellowish scales. T. a. line geminate, broken, as a whole outwardly oblique to the submedian vein and then outcurved to the inner margin. T. p. line geminate, smoky, the inner lunulate, as a whole outwardly bent over the cell and a little incurved below that point. The s. t. line is paler, marked by yellowish scales. The apex is yellowish, preceded by dusky scales, which form lunules or a continuous shade. All the veins dusky. Median shade smoky brown, fairly well defined, bent at the end of the median vein. The ordinary spots concolorous, orbicular of good size, narrowly ringed by brown scales, round or nearly so; reniform, moderate in size, the sides almost equal, narrowly defined by smoky scales. Claviform double, as usual in the genus, narrowly outlined by brown scales. Secondaries whitish to smoky, with a discal lunule, an extra median dusky line and subterminal dusky shade, beyond which the wing is paler and shades to a dusky terminal line. Beneath whitish or with a reddish tinge, powdery, both wings with an outer smoky line and discal lunule. Expanse 1.50-1.60 in.; 37-40 mm.

Hab.—Colorado, Bruce.

Male and female are before me and differ little except in the slightly darker shading of the male, which may not be a permanent difference. The species is easily recognizable by the uniform rusty coloration, without any contrasts, and on which the ordinary lines or markings are yet fairly well evident. The male agrees with the species preceding in the sexual characters. The harpes are very broad at the base, narrow very abruptly to a rounded tip, and this is rather densely clothed with stout pointed spurs or stiff spines. The clasper is a very simple, stout, slightly curved claw.

Hydroecia angelica n. sp., pl. 2, fig. 28, ♂ genitalia.

Ground color a yellowish luteous, more or less powdered with brownish scales. Head and thorax with a strong mingling of purplish brown scales, which are well evident at the tip of the patagiae and on the posterior tuft. Primaries with the markings obscure, except that the t. p. line is well marked. Basal line traceable, the basal space a little purplish powdered. T. a. line geminate, nearly upright, with a distinct angulation on the median vein, an inner tooth on the submedian vein, and an outcurve below that. The outer part of the line is a little rusty and hardly traceable; the inner is purplish and shades into the basal space. T. p. line geminate, the inner line rusty, evident, but not contrasting; the outer portion broad, prominently shaded with purplish brown. The inception of the line is a little beyond the middle and inside the reniform, but it bends abruptly on the subcostal vein to beyond the cell. Over this it is somewhat broadly outcurved, and is then almost evenly oblique to the inner margin, broken by a small outward tooth on the submedian vein. The s. t. line is vaguely indicated by a series of obscure rusty lunules, which are just barely traceable. There is a series of terminal brown lunules, and beyond this the fringes evenly purplish. The median line is obvious, narrow, brown, irregular, but as a whole nearly upright in course, much closer to the t. p. than the t. a. line. Orbicular rather small, round or nearly so, with a narrow brown ring and a brownish central dot. The reniform is large, kidney shaped, not well defined, with a brown lunule at the end of the cell. Inferiorly there is a smoky patch, which extends backward along the median vein nearly to the orbicular. Secondaries whitish, with a glistening yellow tinge, which shows a dash of purplish reflection. Veins a little

dusky marked, with a faint extra median line, as well as a smoky discal lunule. Beneath pale straw yellow, powdery. Both wings with a brownish, extra median line; secondaries with a blackish discal spot. Expanse 1.36 in.; 34 mm.

Hab.—Los Angeles Co., Calif., collected by Mr. Coquillett and numbered 421.

The specimen is a male from the U. S. National Museum and is in good condition, save that the abdomen is a little greasy. In sexual characters the insect is typically like the white-spotted forms; but there is no trace of white marks in the example before me. On close comparison it will be seen that the markings are like *nitela*, and the insect has its relations most evidently with the series, of which that species forms a part. The male characters in this species revert to the type. As usual in this section of the genus we have the forked tip set with spines; and the rather long, curved, pointed clasper, the edges of which, in the single specimen that I have had under examination, seem to be even.

Hydrœcia cataphracta Grote, pl. 2, fig. 29, ♂ genitalia.

1864.—Grote, Proc. Ac. Nat. Sci. Phil., iii, 81, pl. 2, f. 3, *Gortyna*.

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 111, 142, *Hydrœcia*.

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.

1891.—Dyar, Can. Ent., xxiii, 157, larva.

1893.—Smith, Bull. 44th U. S. Nat. Mus., 176, *Hydrœcia*.

1898.—Bird, Can. Ent., xxx, 128, larva.

Ground color yellow, with purplish powderings and shadings. Head and thorax almost entirely purplish; the tip of the collar and the disc of the thorax remaining of the ground color. Primaries with all the markings fairly evident. Base, within the geminate basal line, of the ground color. T. a. line geminate, rather evenly outcurved, or almost upright to the submedian vein, and then with a long outcurve. From the costa to the submedian vein the basal space is purplish, except as already stated. T. p. line geminate, the inner line very narrow, brown, outcurved over the cell and a little incurved below. The inner line more or less lunulate, and this indeed may be the case with the outer line, though, as a rule, it is almost even. The s. t. space is purplish and usually contrasts with the terminal space, which is more nearly of the ground color and relieves the irregular, outwardly dentate s. t. line. The fringes are purplish, a white dotlet marking the end of each vein. The apex is of the ground color, and below that the terminal space is more or less powdered with purplish. The median shade line is variably distinct, sometimes a mere vague powdering, sometimes quite sharply defined as a narrow line, which is bent at the lower end of the reniform. The median space is powdered with rusty brown, except in the ordinary spots, which are thus relieved, though not differing in any other respect from the ground color. Orbicular moderate in size, round, or with a tendency to become triangular, narrowly ringed by brown scales. Secondaries smoky, tending to become shaded with purplish, which is the case also with the abdomen. Beneath the ground color is yellowish, strongly powdered with gray and brown. Both wings with a smoky outer line, the secondaries with usually a distinct discal spot, which may be indicated on the primaries as well. Expanse 1-1.80 in.; 25-45 mm.

Hab.—Canada to District of Columbia, west to Colorado. Canada in Sept.; Northern New York in Oct.; Westchester Co., N. Y., Sept.

Except for the variation in size this species differs little. There is a difference in the amount of the purplish shading, particularly beyond the t. p. line. There is also some difference in the amount of contrast and in the amount of powdering in the median space, but in other respects it runs remarkably constant. Except for the species of economic importance this seems to be the most common of the lot, and is most generally represented in collections. The male structures are typical of this section of the genus. The triangular tip is well set with spinules, and the long curved clasper has the edges distinctly irregular.

Hydræcia impecuniosa Grote.

1881.—Grote, Bull. Geol. Surv., vi, 267, *Gortyna*.

1882.—Grote, Can. Ent., xiv, 184, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 176, *Hydræcia*.

Ground color a powdery, rusty red-brown, more or less shaded with purplish. Head and thorax very strongly shaded. Primaries with the extreme base of the ground color to the geminate basal line. T. a line outwardly bent between the veins, as a whole upright to the submedian vein, then with a long outcurve to the inner margin. Above the submedian vein the basal space, except within the basal line, is purplish. T. p. line geminate, unusually close to the outer margin, the inner line very feebly developed and hardly distinguishable in some specimens; the outer broad and distinct, very strongly bent below the costa and then running almost parallel with the outer margin and inwardly oblique to the hinder margin. S. t. line, yellowish, defined chiefly by the difference between the purplish s. t. space and the less powdery terminal space. The apex of the palest ground color. Fringes purplish. The median shade is unusually prominent, blackish or very dark purplish brown, almost rectangularly bent below the reniform. The ordinary spots are well defined, but not white marked. Orbicular small, round, with a central brown dot, else of the palest ground color. Reniform moderate or rather small in size, only a little constricted in the center, with the usual central lunule, but otherwise without powdering. The claviform is double, as usual, of the palest ground color and without powdering in the specimens before me. Beneath powdery, shaded with purplish, with a broad, common outer line and a fairly well-marked discal lunule on both wings. Expanse 1.20–1.50 in.; 30–37 mm.

Hab.—Massachusetts; New York; New Hampshire; Illinois. Ithaca, N. Y., October 6th; Amherst, Mass., September 20th; Champaign, Ill., at electric light, September 27–28th.

This is a rare species apparently, and I have seen only four specimens in which, fortunately, both sexes are represented. The species is quite markedly distinct by the unusually pointed primaries. They are really acute, and as a whole are rather narrower than those of the other species immediately allied to them. In the male the sexual pieces offer nothing that is peculiar.

Hydræcia circumlucens n. sp., pl. 2, fig. 31, ♂ genitalia.

Ground color an even yellowish or red-brown, with powderings. Head and thorax shaded with purplish: a white tuft at the base of the antennæ. The disc of the thorax is more nearly of the ground color, and indeed the amount of purplish shading varies in the different examples. Primaries with a white dot at the middle of the base, all the lines traceable, but none of them contrasting. Basal line geminate, extending to the middle of the wing, sometimes a little white marked, occasionally, in the darker specimens, scarcely traceable. T. a. line geminate, as a rule white marked on the costa, but this also varies; a little incurved and inwardly oblique to the submedian vein and then with the usual strong outcurve. T. p. line broadly bent over the cell, well removed outwardly, then oblique and a little curved to the inner margin. The line is geminate; but the inner portion is quite usually obsolete. S. t. line marked by the contrast between the usually darker s. t. space and the terminal space; also emphasized by a few yellowish scales. It is outwardly toothed on the veins and irregular as a whole. The apex is yellowish. The veins are marked with purplish, the median shade line narrow, purplish brown, not contrasting, bent below the reniform. The inception of the t. p. line on the costa is marked by a white spot, and there are three white dots on the costa before the s. t. line. The ordinary spots are white and contrasting; the orbicular triangular, narrowly outlined by dark scales, the reniform moderate in size, a little constricted centrally, the lower portion a little broader than the upper, the central portion consisting of a yellow lunule surrounded by white, broken into spots as usual by the veins. The claviform is double, white, the upper spot being uniformly smaller than the lower. Secondaries varying from yellowish to purplish, sometimes with a central lunule. Beneath shaded with reddish over a yellowish ground, hardly powdered, even on the secondaries the veins a little darker. An outer line in most of the specimens under examination, though a trace only in the darkest examples. Expanse 1.28-1.60 in.; 32-40 mm.

Hab.—Newark, N. J.; Long Island, N. Y.; Pennsylvania; Champaign, Ill.; Nebraska.

This species has been confused with *rutila* in collections generally; but it differs from that species quite obviously. It is a very narrow form in the first place, which makes the primaries look shorter, it is even in color, without powderings, and finally there is hardly any contrast between the different portions of the wing: the s. t. space, especially, being scarcely darker than the balance of the wing. There is very little variation, so far as the specimens before me indicate. Altogether ten examples have been under examination from various collections. The male offers nothing that is peculiar, and is of the regulation type for this series. The clasper seems a little more toothed than in *rutila*, and is perhaps a little longer in proportion. The tip of the harpe is not quite so much notched.

Hydræcia rutila Gn., pl. 2, figs. 32 and 33, ♂ genitalia.

1852.—Gn., Spec. Gen. Noct., i, 123, pl. 6, f. 1, *Gortyna*.

1856.—Wlk., Cat. Brit. Mus. Het., ix, 157, *Gortyna*.

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 111, *Hydræcia*.

1881.—Grote, Bull. Geol. Surv., vi, 268, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 177, *Hydræcia*.

Ground color yellowish red, powdered with rusty brown. Head and thorax shaded with purplish, a white tuft at the base of the antennæ, tip of the collar pale. There is a white spot at the middle of the extreme base of the wing. Basal line geminate, extending to the middle of the wing and within it the base is of the palest ground color. Beyond this line the basal space above the submedian vein is filled with purplish, and this sometimes extends through the cell, forming a dark cloud, which is quite prominent in some specimens. T. a. line geminate, inwardly oblique, rather difficult to trace in most examples, except below the submedian vein, where it is strongly outcurved. T. p. line geminate, outcurved over the cell and almost evenly oblique below that point. S. t. line irregular, outwardly dentate on the veins, the lower rusty brown. The s. t. space is contrastingly purplish, and this shading may extend so as to darken the terminal space, except at the apex. The fringes are also purplish. The median shade line is narrow, not very obvious in most cases above the reniform, obliquely inward to about the middle of the inner margin. The ordinary spots are distinct; the orbicular moderate in size or rather large, with a tendency to become triangular in shape, sometimes with a dusky central dot. The reniform is moderate in size or rather small, almost even, the white margining spots rather narrow, so that as a whole the spot is not so strongly contrasting as in some other cases. The claviform is double, the upper spot as a rule hardly half the size of the lower, the latter varying from round to oval, the oval being the more usual form. Beneath yellowish, powdered with purplish, with a discal lunule and a more or less obvious outer line on both wings. Expanse 1.28-1.68 in.; 32-42 mm.

Hab.—From Canada to Virginia, west to Colorado; Maine; Massachusetts; New York in September; Central Illinois, August 29th; Champaign, Ill., August 3rd.

This is one of the most common forms belonging to this series and is represented in most collections. It is powdery, and the contrasting s. t. space is easily recognizable in good examples. The reniform is not strongly contrasting, the white spots being narrow and the central portion or lunule being itself not very large. There is nothing to be added to what has been already said of the sexual characters, which are of the usual type. In the figures 33 shows the parts flattened out on the slide and distorted by crushing. It is a camera lucida sketch like all the others and illustrates the importance of seeing rightly.

***Hydroecia appasionata* Harv.**

1876.—Harv., Can. Ent., viii, 155, *Gortyna*.

This species is perhaps best described by comparison with *rutila*, with which it is generally confused in collections. It is indeed, on close examination, more like *limpida*, but much redder in general tint. The main characteristic in this species is the very large reniform, the inferior portion of which is much larger than the upper, and this constitutes the most striking feature. The primaries are also much more prominently shaded with purplish, this shading extending through the median and filling almost the entire terminal space. In other respects and in general type of marking the resemblance to *rutila* is evident. Expanse 1.20-1.50 in.; 32-37 mm.

Hab.—Long Island, N. Y.; London, Ontario.

By the kindness of Mr. Moffatt I have an example from London,

from which locality Dr. Harvey's type was received. This example agrees very well with the description, and I have no others that agree as closely. Dr. Harvey's specimen was evidently a very fresh example, in which all the contrasts were well defined. Ordinarily the examples appear much more sordid than mentioned by him. Only three examples all told are before me and none of those are males.

Hydræcia marginidens Gn., pl. 2, fig. 34, ♂ genitalia.

1852.—Gn., Spec. Gen. Noct., i, 123, *Gortyna*.

1856.—Wlk., Cat. Brit. Mus. Het., ix, 157, *Gortyna*.

1873.—Grote, Bull. Buff. Soc. Nat. Sci., i, 111, *Hydræcia*.

1881.—Grote, Bull. Geol. Surv., vi, 269, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 177, *Hydræcia*.

Ground color a muddy, yellowish red-brown. Head and thorax with a slight purplish shade, the tip of the collar white, a white tuft at the base of the antennæ. Primaries not strongly powdered. As a whole the median space is slightly more reddish or yellowish than the rest of the wing, the basal space and all beyond the t. p. line having a purplish or darker red-brown shading. Basal line geminate, extending to the middle of the wing, and between it and the base the wing is white. T. a. line geminate, not strongly marked, very frequently with white scales between the brown defining lines: its course, as usual, a little incurved to the submedian interspace and then strongly outcurved to the margin. T. p. line broadly curved over the cell, then inwardly oblique. It is geminate, the outer portion heavier, purplish and irregular, the inner more brown and with a strong tendency to become lunulate. S. t. line pale, irregular, dentate on the veins, largely defined by a slight difference in shading between the terminal and s. t. spaces. There is a brown terminal line at the base of the fringes, and the apex is yellowish. The median shade line is narrow, usually fairly well defined, a little irregular, somewhat evenly outcurved, or with only a feeble angle below the reniform. Sometimes it is a little lunulate. The ordinary spots are all present; the orbicular white, moderate in size tending to become triangular, often with a brown central dot, reniform large in every direction, little constricted centrally, considerably broader inferiorly than above. There is the usual irregular central lunule, which, in this species, is also white and is completely surrounded by white spots, which are bounded by the brown veins. The claviform is as usual broken, the two parts similar in size, the upper crossed by a portion of the t. a. line, and as a whole a little smaller than the other. The secondaries are dull, very pale yellowish, with a rosy tinting. There is an outer line visible in some specimens and this may be modified into an s. t. shade. In some instances a smoky lunule is also visible. Beneath pale, shading from yellowish to purplish, more or less powdery along the margins, with a rather distinct and narrow outer line, and a more or less evident discal lunule, which is quite frequently absent on the primaries. Expanse 1.50-2 in.; 27-50 mm.

Hab.—Northern, Eastern and Middle States. Albany County, N. Y., Sept. 18th; Illinois in Sept.; New Jersey; Virginia; Mass.

This is a large species resembling *cerrusata* in some respects. It is easily distinguished from the other red species by the irregular reniform, which, besides being very large, has the inferior portion much broader than the upper. In this it agrees with *appassionata*, but that species is smaller, much deeper in color and more powdery.

Some of the small examples of this species I have seen marked *rutila* in collections; but for that species the shape of the reniform is always a good distinctive feature. The male characters are much as in the allied species, except that the harpes are unusually broad, the clasper is perhaps a little longer and more twisted than usual; but this may be due to the large size of the entire insect.

Hydroecia furcata n. sp., pl. 2, fig. 35, ♂ genitalia.

Ground color varying from straw yellow to reddish luteous. Head and thorax in the paler specimen with a rosy tinge, particularly well marked on the head, at the sides of the collar and at the tips of the thoracic and abdominal tuftings. In the darker specimens this tuft becomes purplish. Primaries with all the markings fairly evident. Basal line geminate, brownish, tending to become obscure, and in the darker specimens merged into the ground color, leaving the intervening spaces a little paler. T. a. line geminate, brownish, irregular, as a whole somewhat inwardly oblique from the costa to the submedian vein, below which it makes an outcurve so that the termination of the line on the internal margin is almost opposite its inception on the costa. Here also the tendency is, in dark specimens, to lose the lines and leave the included spaces a trifle paler. T. p. line geminate, crenulate, the inner line best defined, but the outer one almost equally distinct. As a whole the line is very evenly curved over the cell and below that point nearly parallel with the outer margin or with only a slight incurve. S. t. line irregular, outwardly dentate on the veins, somewhat lunulate and marked by a preceding dusky shading, the terminal space being a little paler, except where cut by the brownish veins. There is a terminal brown line, beyond which the fringes are brownish or a little purplish. There is an obvious median shade which is a little diffuse, outwardly oblique from the middle of the costa to the median vein, where it touches the reniform, and is then inwardly oblique and even to the inner margin. The orbicular is white, defined by a brownish line and is somewhat irregularly oval. The claviform is elongate, a little irregular, also white and with a brown outline. Between these two spots is a small white dot situated just below the median vein and also with brown outlines. A small white dot is on the median vein just beyond the basal line. The reniform is very large, a little constricted centrally, the lower portion considerably broader than the upper; the center of the spot a yellowish lunule, which is incompletely ringed with white, the white extending beyond the cell and cut up into small spots by the brown veins which run through it. In all there are seven spots varying in size and shape according to their location, which compose the outline of the reniform. Secondaries whitish or yellowish, without markings of any kinds. Beneath whitish or yellowish, immaculate. Expanse 1.25-1.80 in.; 31-45 mm.

Hab.—Long Island, N. Y.; Carlstadt, N. J., Doll; Manchester, N. H., Ottolengui; Urbana, Ill., Forbes.

Five specimens, all males, are before me. The insect resembles very strongly the *serrata* of the Rocky Mountain fauna; but the antennæ of the male are ciliated only, the joints hardly marked. The insect also resembles *marginidens* quite strongly and is probably confused with that species in collections. It differs by the paler color throughout, by the general absence of white spots in the basal

space inside of the basal line, by the very small dot between the white orbicular and claviform, and finally by the shape of the reniform, in which the center is never white and in which the inferior portion is very much larger than the upper. In the secondaries of this species there is no trace of maculation. Finally, and more important than all, the sexual pieces are characteristic. While the harpes agree in a general way with those of *marginidens* and its allies, the clasper is absolutely unique. We have what may be considered the typical hook; but near its apex there arises a long, slender, curved branch like the prong of a deer's horn. There is nothing like this in the genus, and the species is therefore easily recognized when a male is at hand. The range of size is as great as that of *marginidens*, which it so closely resembles.

Mr. Doll informs me that the larva of this species bores in the young shoots of ash.

Hydræcia erepta Grote.

1881.—Grote, Bull. Geol. Surv., vi, 267, *Gortyna*.

1893.—Smith, Bull. 44 U. S. Nat. Mus., 175, *Hydræcia*.

"A stout and rather aberrant form. Eyes naked; front unarmed; tibiae unarmed; feeble dorsal tuftings on the abdomen. Yellow. Fore wings dull orange yellow with the lines fuscous, simple. The exterior well removed outwardly, a little waved between the veins. Half line present; interior line uneven, a little outwardly projected below median vein. Claviform a simple outline, incomplete. Orbicular concolorous, a small ringlet. Reniform small, a white half-moon in a blackish shade. Hind wings dull yellowish, with faint discal mark and exterior line. Beneath dull yellowish, with faint exterior common line and discal marks. The insect is nearly concolorous; fore wings and thorax darker. An even terminal line on primaries. Antennæ simple, ciliate beneath. Expanse 34 mm."

Douglas County, Kansas, Professor Snow.

Synonomical List of the Species.

HYDRÆCIA Gn.

HYDRÆCIA.

1. *H. albilunata* Sm.
lunata || Sm.
2. *H. u-album* Gn.
purpuripennis Grt.
baliola Morr.
3. *H. velata* Wlk.
sera G. and R.
4. *H. interoceanica* Sm.

5. *H. atlantica* Sm.
nictitans ‡ Auct.
americana Speyer.
lusca Harr., mss.
6. *H. pacifica* Sm.
7. *H. juvenilis* Grt.
8. *H. immanis* Gn.
9. *H. stramentosa* Gn.
10. *H. obliqua* Harv.

11. *H. medialis Sm.*
12. *H. pallescens Sm.*
13. *H. senilis Sm.*
14. *H. serrata Grt.*

PAPAIPEMA.

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|---|---|
| <ol style="list-style-type: none"> 15. <i>H. cerina Grt.</i> 16. <i>H. inquesita G. and R.</i>
<i>quesita Grt.</i> 17. <i>H. speciosissima G. and R.</i> 18. <i>H. rigida Grt.</i> 19. <i>H. harrisii Grt.</i> 20. <i>H. verona Sm.</i> 21. <i>H. purpurifascia G. and R.</i>
<i>leucostigma</i> Harr. 22. <i>H. nitela Gn.</i>
var. <i>nebris Gn.</i> | <ol style="list-style-type: none"> 23. <i>H. nelita Streck.</i> 24. <i>H. necopina Grt.</i> 25. <i>H. limpida Gn.</i> 26. <i>H. cerussata Grt.</i> 27. <i>H. frigida Sm.</i> 28. <i>H. unimoda Sm.</i> 29. <i>H. angelica Sm.</i> 30. <i>H. cataphracta Grt.</i> 31. <i>H. impecuniosa Grt.</i> 32. <i>H. circumlucens Sm.</i> 33. <i>H. rutila Gn.</i> 34. <i>H. appasionata Harv.</i> 35. <i>H. marginidens Gn.</i> 36. <i>H. furcata Sm.</i> |
|---|---|

Unknown to me.

37. *H. erepta Grt.*

EXPLANATION OF PLATE I.

Male genitalia of *Hydræcia*, the figures showing harpe and clasper in each case. The figures on plates 1 and 2 are numbered consecutively.

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|---|--|
| <ol style="list-style-type: none"> 1. <i>H. albilunata Sm.</i> 2. <i>H. u-album Gn.</i> 3. <i>H. velata Wlk.</i> 4. <i>H. interoceanica Sm.</i> 5. <i>H. atlantica Sm.</i> 6. <i>H. pacifica Sm.</i> 7. <i>H. nictitans Linn. (Europe).</i> 8. <i>H. juvenilis Grt.</i> 9. <i>H. immanis Gn.</i> | <ol style="list-style-type: none"> 10. <i>H. stramentosa Gn.</i> 11. <i>H. obliqua Harv.</i> 12. <i>H. medialis Sm.</i> 13. <i>H. pallescens Sm.</i> 14. <i>H. senilis Sm.</i> 15. <i>H. serrata Grt.</i> 16. <i>H. cerina Grt.</i> 17. <i>H. inquesita G. and R.</i> 18. <i>H. rigida Grt.</i> |
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EXPLANATION OF PLATE II.

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|---|--|
| <ol style="list-style-type: none"> 19. <i>H. harrisii Grt.</i> 20. <i>H. verona Sm.</i> 21. <i>H. nitela Gn.</i> 22. <i>H. nebris Gn.</i> 23. <i>H. necopina Grt.</i> 24. <i>H. limpida Gn.</i> 25. <i>H. cerussata Grt.</i> 26. <i>H. frigida Sm.</i> 27. <i>H. unimoda Sm.</i> | <ol style="list-style-type: none"> 28. <i>H. angelica Sm.</i> 29. <i>H. cataphracta Grt.</i> 30. <i>H. impecuniosa Grt.</i> 31. <i>H. circumlucens Sm.</i> 32. <i>H. rutila Gn. normal.</i> 33. <i>H. rutila Gn. distorted by flattening.</i> 34. <i>H. marginidens Gn.</i> 35. <i>H. furcata Gn.</i> 36. <i>H. purpurifascia G. and R.</i> |
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Purpurifascia is out of its place in the numbering; it should have followed *H. verona*. No. 22 is the normal form in *nitela*; *nebris*, No. 21, has the clasper and the harpe a little flattened.



